A CHILTON PUBLICATION

The Iron Age

THE NATIONAL METALWORKING WEEKLY July 1, 1954

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KNOWING YOUR END-PRODUCT SERVICE REQUIREMENTS AND THE FABRICATING METHODS YOU EMPLOY... CMP CAN ENGINEER SPECIFICATIONS AND PROCESSING OF COLD ROLLED STRIP STEEL TO DEVELOP QUALITIES WHICH MAY GREATLY REDUCE YOUR END-PRODUCT COSTS WHILE MAINTAINING OR EVEN IMPROVING PRODUCT QUALITY AND PERFORMANCE. THIS MAY BE YOUR KEY TO SAVINGS IN MANUFACTURING COSTS WITHOUT CAPITAL INVESTMENT.

#1

PRECISION COLD ROLLED CMP STRIP STEEL

the Cold Metal Products co.

GENERAL OFFICE: YOUNGSTOWN 1, OHIO
PLANTS: YOUNGSTOWN, OHIO AND INDIANAPOLIS, INDIANA
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LESS AND ALLOY STRIP STEEL,
TEMPERED SPRING STEEL.

LOW CARBON, HIGH CARBON (Annealed or Tempered), STAINLESS AND ALLOY GRADES, ELECTRO ZINC COATED ARE AVAILABLE FROM:
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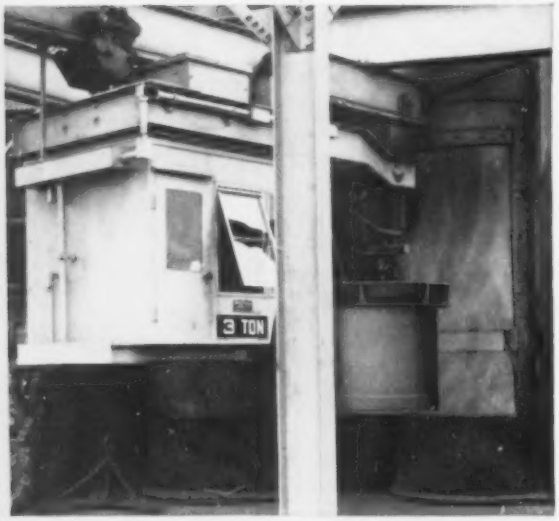
Phones: N. Y., COrtlandt 7-2427; N. J., UNionville 2-6900

Mechanical Charging...



Whiting will engineer the complete charging system for you—large or small—simple or complex. You'll *increase* production—save money!

YOUR GREATEST COST-CUTTING OPPORTUNITY!

Mechanical charging is today's biggest cost cutter! The average foundry *handles 100 tons* of material to turn out *one* ton of finished castings. With a fully mechanized Whiting system, two to four men can make up and charge 20 to 50 tons per hour. Hand methods require 18 to 20 men to do the same work.

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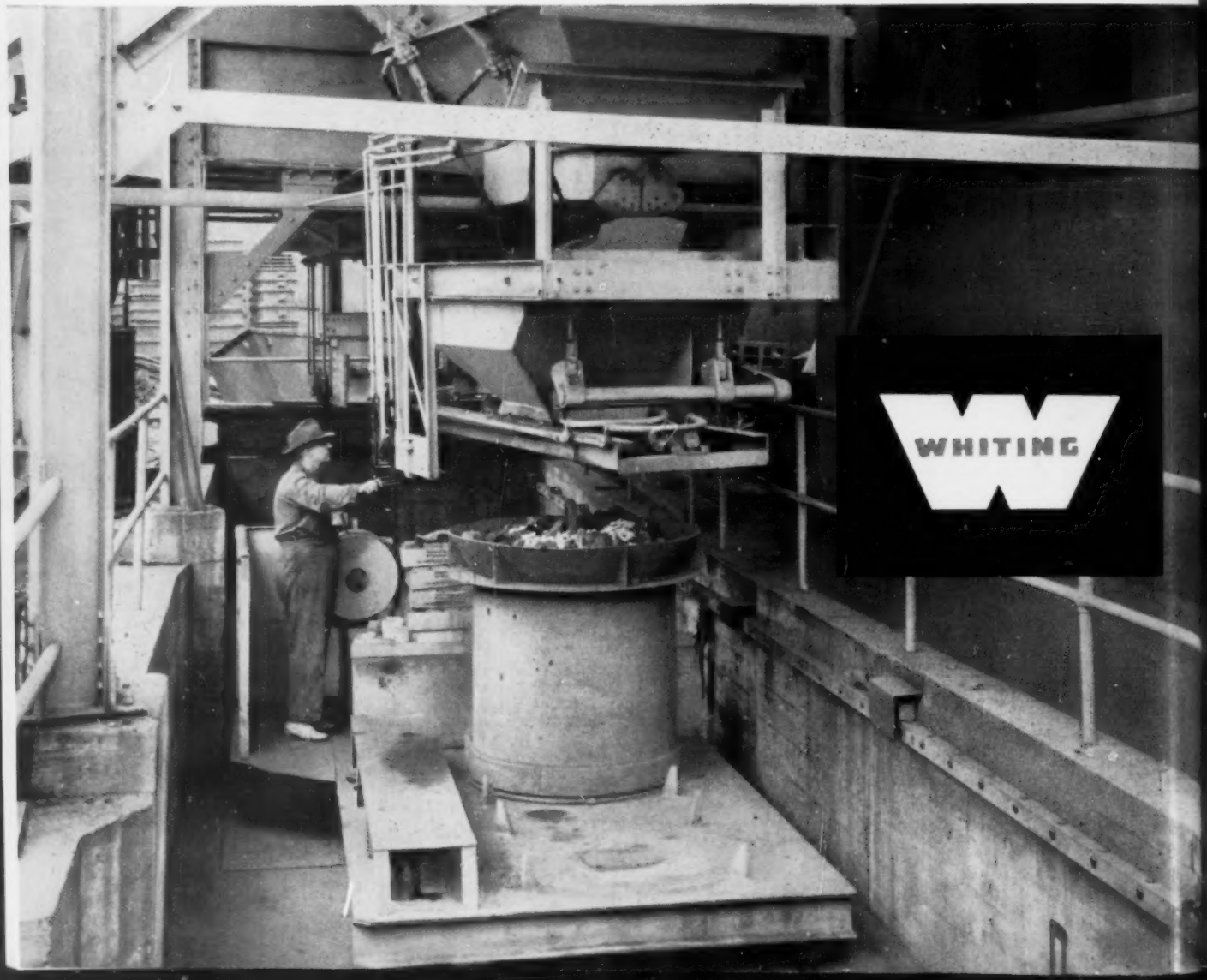
WHITING CORPORATION

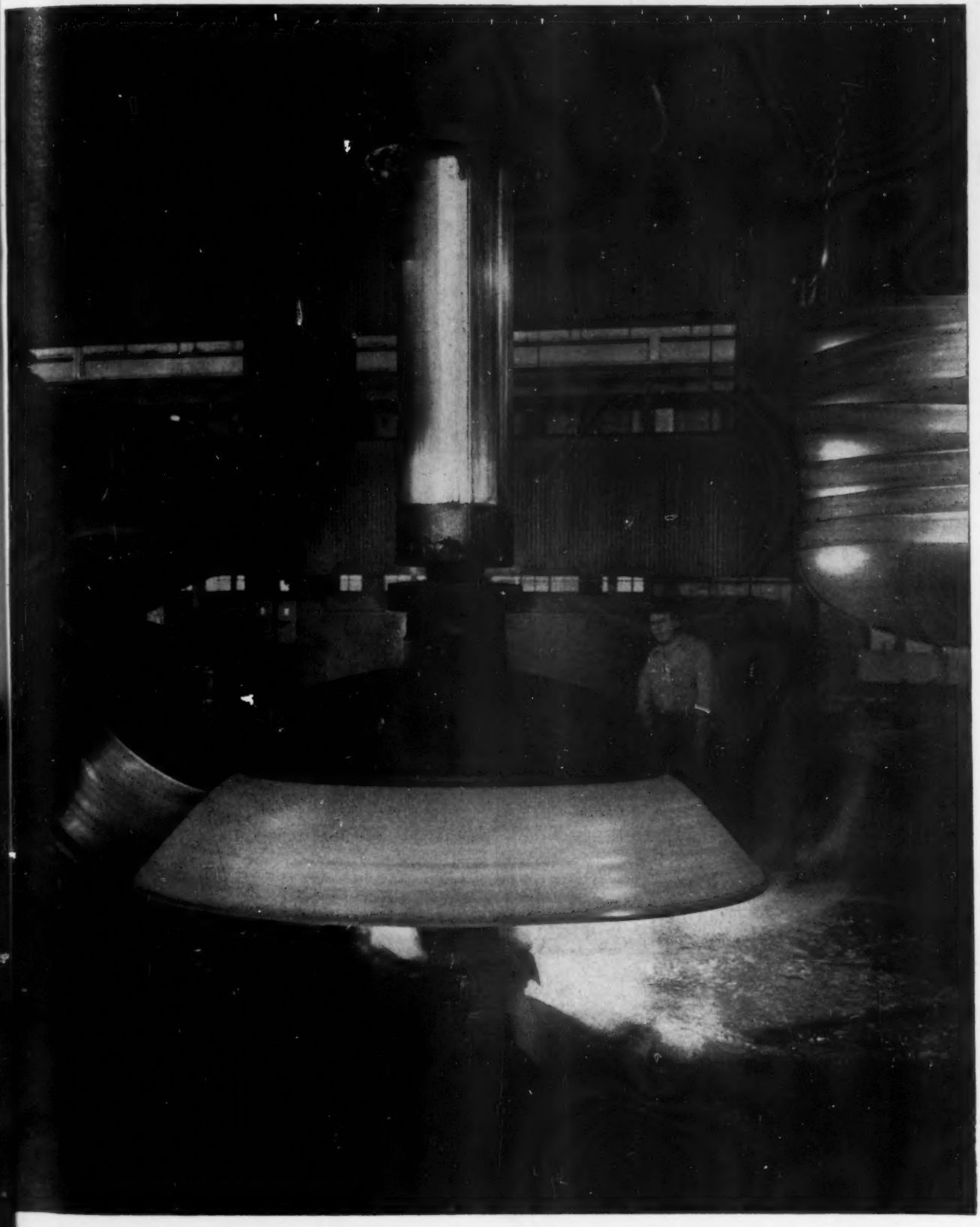
15601 LATHROP AVE., HARVEY, ILLINOIS

In Canada: Whiting Corporation (Canada) Ltd., Toronto 9, Ontario

Write today for Bulletin FY-153 . . .

a 36 page booklet that gives complete information on all types of Whiting Charging Systems.





FLANGED-AND-DISHED HEADS FOR EVERY NEED You can choose from eight different types of Bethlehem heads—tank car, obround-tank, elliptical, flanged-only, double-dished, standard, shallow and ASME Code flanged-and-dished. We spin or press flanged-and-dished heads in sizes up to 144 in., and in thicknesses ranging from ⅛ in. up to 3½ in. In addition, we produce standard manholes and covers, hand holes and covers, flue holes, pipe flanges and collar flanges. The nearest Bethlehem sales office is at your service.

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The Iron Age

Vol. 174, No. 1, July 1, 1954

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DIGEST of t

NEWS DEVELOPMENTS

FOUNDRY BUSINESS UP BUT STILL LAGS 1953 — P. 63
Foundry business picked up during June. And second quarter will be better than first quarter. But business for the first half is about 15 pct below last year's level. Vacations will bring a decline in July, but another pickup is expected in August. The entire year may be about 10 pct below 1953.

INLAND STEEL EYES WIDE-FLANGE MARKET — P. 66
With wide-flange structurals still in excellent demand, Inland Steel Co. is planning to move into the market. Last week the firm indicated it would rework a mill to produce wide-flange beams. Conversion will take 18 months. Capacity will be 325,000 tons yearly of 8 to 24-in. wide-flange beams.

SAFETY CONTESTS CUT ACCIDENT RATES — P. 67
Experiments by Lehigh Structural Steel Co. over 14-year period prove that plant-wide contests pay off. Small prizes at frequent intervals bring a 44 pct drop in lost-time mishaps. A continuous program of safety education and plant safety conditioning is necessary background for contest plan.

ASTM HEARS NEW METAL FATIGUE THEORY — P. 73
Partly reversing earlier beliefs, researchers say that fatigue failure in hardened metals results from softening effect, not further work-hardening as in annealed metals. Others interested but remain skeptical. Propose "least of four" testing, ending test at first failure among four specimens.

PACKARD-STUDEBAKER A STRONG-COMBINE — P. 82
Merger of the two oldest, and the last, of the independent automakers brings definite economies, advantages. Both firms have excellent management, good products. Dealers can get the joint franchise which enables them to cover the entire auto market, compete with 75 pct of truck builders.

SENATE DELIVERED PRICE BATTLE SHAPING — P. 87
New Senate ruckus is now in the making on delivered price legislation. One group, led by Sen. Kefauver, would overthrow a Supreme Court decision okaying "good faith" matching of competitors' prices. Opposing group is led by Sen. Capehart and has White House backing. Speedy action is needed.

the Week in Metalworking

ENGINEERING & PRODUCTION

NEW COATINGS EXPAND USE OF METALLIZING—P. 105
Wider application of the metallizing process is possible through the use of molybdenum coatings. They provide a surface material with good wear resistance as well as a bonding coat for other materials. Bonding method is simple and dependable. No preliminary surface preparation other than cleaning is required.

NONDESTRUCTIVE TESTING METHODS FOR WIRE—P. 108
A rapid, nondestructive test method has been developed to determine percentage of austenite and martensite in fine stainless steel wire. The method, combining both magnetic test and X-ray diffraction techniques, was developed to obtain data not easily obtained using standard metallographic methods.

MOISTURE CONTROL IMPROVES CUPOLA IRON—P. 112
Constant control of moisture content in cupola blast air has helped one company to get better quality and more uniformity in irons it produces. Both chemistry and physical conditions of cupola irons are improved. Use of dehumidfying equipment helps offset both daily and seasonal changes in humidity which affect iron.

DESIGN TOOLING FOR COMPLETE AUTOMATION—P. 114
Transfer press dies have solved the problem of producing a large volume of deep drawn pressed metal parts at AC Spark Plug Div. without manual handling between operations. Progressive dies could not be used. Two large transfer bars move in between strokes of the press and transfer eight partially formed filter shells.

NICKEL PLATE MACHINING SAVES TOOL LIFE—P. 118
Electroplated nickel provides hard, tough surface finishes for building up worn or over-machined parts. As a salvage method, it has several advantages over other surfacing materials, one of which is its machinability. Best machining results are obtained using high-speed tools at cutting speeds of 100 fpm.

NEXT WEEK—USES OF NICKEL IMMERSION PLATING
Ability to produce uniform deposits on internal as well as external surfaces is a major advantage of the nickel immersion process. Properly applied, deposits have other superior properties which make these coatings desirable for many new applications. As plated, coating hardness is about 45Rc.

MARKETS & PRICES

PA'S, GOVERNMENT GIVE BUSINESS VIEWS — P. 71
Purchasing agents, one of the first groups to spot a leveling off of the business decline in March, saw nothing in June to temper their mild optimism. Report June orders, production were up. But government figures show factory inventories are still increasing, durable sales still weak.

MERCANTILE SCRAP PLAN MARCHES FORWARD—P. 75
Despite nearly solid opposition by the scrap trade, the Chicago Mercantile Exchange is carrying on its plan to trade No. 1 and No. 2 steel. Belief is that "hedging" justifies plan. But two problems remain unsolved: What margin will have to be put up? And who'll guarantee that scrap meets specs?

TWO BASIC APPROACHES TO AUTOMATION — P. 93
Mention the word "automation," and you've got an argument on your hands. Not pro and con—just how to do it best. Two basic systems are rotary indexing and straight line transfer. Proponents of former win space argument but backers of second claim lower operating costs, greater flexibility.

STEEL AGREEMENT WILL UP PRICE $3 TO $4 — P. 145
Price of steel will be increased an average of $3 to $4 per ton as a result of wage-pension-insurance package that will cost steel companies 10¢ to 12¢ an hour. Increases likely to be put into effect within a week. Some prices will be raised less than $3, some others more than $4.

STEEL OUTLOOK SLOW FOR NEXT 30 DAYS — P. 147
Market feels no widespread effects of strike hedge buying. Most consumers saw peaceful settlement in view. July vacations bring wholesale shutdowns, will slow business considerably. Ample inventories are cushion against Great Lakes strike. Galvanized pipe producers revise their pricing formula.

COPPER DEMAND MAINTAINS STRENGTH — P. 148
Both domestic and export demand for copper continue at a healthy pace with sales for July stronger than anticipated. July is traditionally slow because of vacation shutdowns. Lead and zinc, after their recent flurry, have now settled back into their former comparatively slow but fairly steady pace.

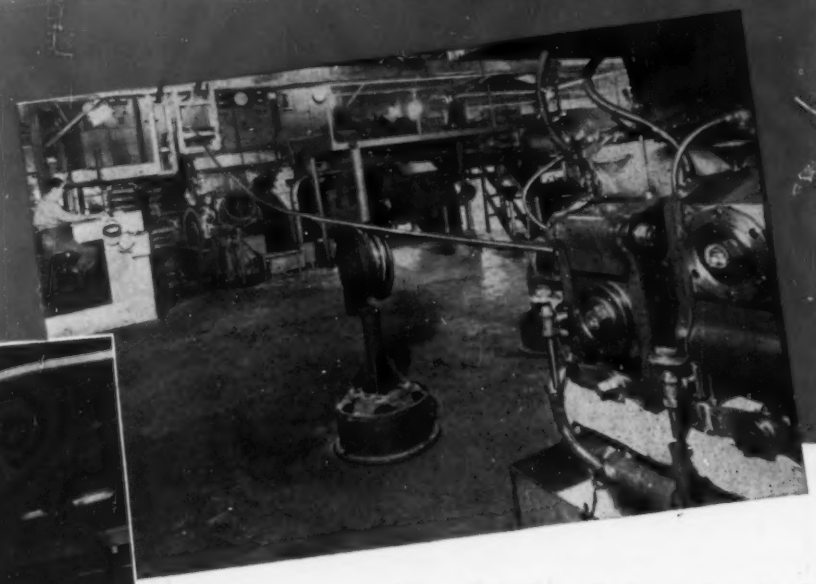
PRODUCES—

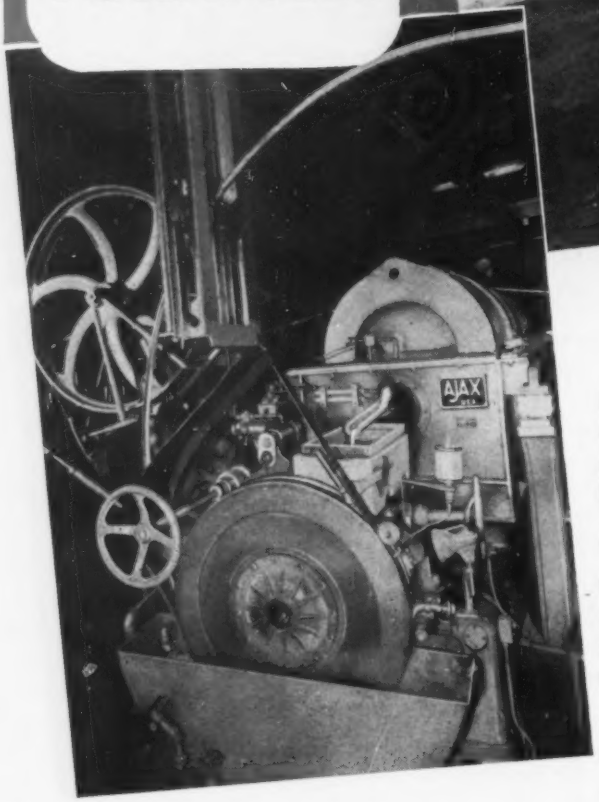
high conductivity aluminum wire direct from the molten metal...

Southwire Company

with the help of

AJAX FURNACES





Above photo shows aluminum rod passing from the Properzi casting machine in the background to the rod mill in the foreground. AJAX furnace is at right of the Properzi machine.

Close-up of Properzi machine showing how molten metal is fed to it from AJAX furnace.

In connection with the well-known Properzi method, the Southwire Company of Carrollton, Georgia, is using an AJAX low-frequency induction furnace for the quick and efficient melting of high purity aluminum.

This combined melting and holding furnace is ideally suited to mass or continuous production processes, because the molten metal can be fed in a steady stream from the holding reservoir of the furnace, which in turn is kept supplied with metal from the melting reservoir.

The induction melting process produces an inherent stirring of the metal due to electrical impulses, resulting in a homogeneous mix. Scrap loss averages less than 1 pct. Working conditions are comparatively clean and cool because the only heat generated is within the melt itself.

Write for Reprint of Article Entitled "ALUMINUM: Continuous Casting Gaining"

AJAX

TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

We Are Americans First

WHEN you and I went to school they called it American History. There were breathtaking stories of heroism, truth and integrity. We did have to remember a few dates but we also tried to learn what went on in men's minds. We knew just what our forefathers fought for. We were a little proud to wave the flag. It meant something.

Now they call it Social Studies. When you ask your kid, "Are you studying American History yet?" you are apt to get a cool answer, "Sure, but we call that Social Studies." This brings us to the question, "Should we be apologetic because we act like Americans?" If your household is one where you still physically and mentally put the flag out on Memorial Day and the Fourth of July you need have no fear for our natural heritages so far as you are concerned.

If your home is one where the exploits of early Americans and today's patriots are on the shelves—and read—you have no trouble brewing so far as your family is concerned. If you and yours hold to the basic tenet that investigations and public hearings—with their sometimes lusty arguments—are part of the democratic processes you are in no danger.

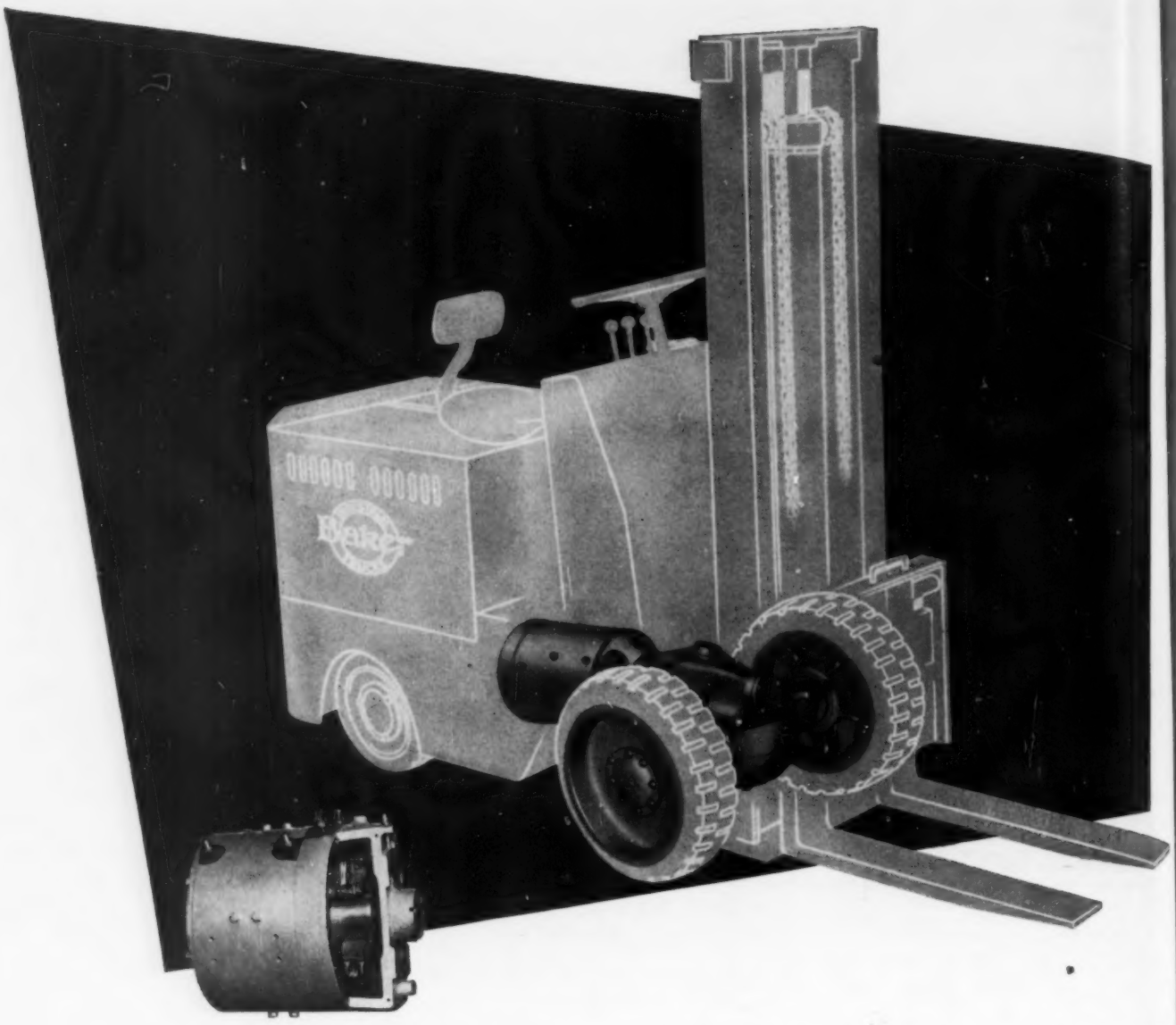
But if you are hemmed in with the idea that to be an internationalist is to forego normal flag waving and pride of heritage then you might be in for trouble unless you go back and review some simple history of your country. That will reassure you. If you have any self-conscious feeling when you uncover as the flag goes by or if you feel a little foolish when you say that this is one of the greatest countries in the world—don't feel that way. You don't have to.

The same principles for which we fought in the Revolution guide our country today. They may be hard to see in our schools, in our clubs, on the street corners or at the soapbox meeting places. But they are there.

It is fine to be internationally minded. It is a must to be well read and understand the economy and thinking of our allies. It is our duty to be strong and to be prepared to meet the communistic threat everywhere. But it is not necessary for us to lose our own American birthright in trying to "understand" both our allies and their problems. Perhaps now is the time for them to try to understand us a little better.

Tom Campbell

Editor



Baker motors use "T formation" for more drive power

The travel motor in an industrial truck is called on to accelerate the truck 300 to 800 times a day. The hoist motor must lift and tilt the load for every start. Power requirements vary widely —a 4,000 pound capacity truck may need only 3½ horsepower normally—but under certain conditions a momentary demand for as high as 50 horsepower may be made of the motor.

No ordinary industrial electric motor is designed specifically for such a job, *so we build our own.*

We've developed and patented many exclusive features—features that mean almost 25% more power for size and weight, easier maintenance, fewer burn-outs, less heat. There's about 30% more copper in Baker motor windings. The "T" slot armature design allows 25% more available area in the armature laminations, resulting in increased magnetic force and reduced current requirements. Special design of field coils and lead terminals are among the other features that mean *more power to you.*

For more detailed information on Baker Fork Truck features, write for 4-color sketch book —Bulletin 64. The BAKER-RAULANG Company, 1227 West 80th Street, Cleveland 2, Ohio.

Baker.
industrial trucks

Dear Editor:

Letters from readers

Salute to New England

Sir:

. . . Your "Salute To New England" is a very impressive section and we want to congratulate the editors of THE IRON AGE on a very fine job.

If they are available, we would like to have 50 copies of the special study which we will be glad to pay for, naturally.

C. H. PIHL
Asst. Secretary
Copper & Brass Research Assn.
New York

New Ceramic Material

Sir:

In the June 3 issue there was an article, starting on p. 128, "Show Stars New Materials for Industry." We are particularly interested in the new ceramic magnetic material. Could you give us the name and address of the manufacturer.

H. B. AHLBERG
Plant Manager
Commercial Filters Corp.
Melrose, Mass.

The ceramic magnet material is made by Ferrocube Corp. of America, Saugerties, N. Y.—Ed.

Cold Forming Splines

Sir:

In the June 10 issue reference was made in the Newsfront Forecast to cold forming of splines on shafts.

I would appreciate it very much if you could tell me where such machines have been installed and by whom they were manufactured.

H. B. OSBORN, JR.
Technical Director
Tocco Div.
Ohio Crankshaft Co.
Cleveland

Further information may be obtained from Michigan Tool Co., 7200 E. McNichols Road, Detroit 12, Mich.—Ed.

High Temperature Enamels

Sir:

In the Newsfront section of your issue of May 27 you mention white and black high temperature enamels used on jet engine combustion chambers.

Can you tell us where we may obtain further information on these particular high temperature coatings?

G. F. BARBER
Metallurgist
Fenwal, Inc.
Ashland, Mass.

More information on the black and white high temperature enamels may be had from Bettinger Enamel Corp., Gore St., Waltham, Mass.—Ed.

Zone Melting

Sir:

We are a twofold subscriber to THE IRON AGE and recently picked up the article, "Zone Melting Purifies Germanium," in your Mar. 11 issue, p. 78, written by R. L. Hatschek.

This writer would like to know if more detailed information on this technique is available. We have a problem at present that could possibly be solved with this technique and your cooperation in helping us will be more than appreciated.

A. J. MATLEN
Carbiform Co.
Detroit

W. G. Pfann, Bell Telephone Laboratories, Mountain Ave., Murray Hill, N. J., credited with the invention of the process, will be able to help you.—Ed.

Built-In Gaging

Sir:

Referring to the June 3 issue, p. 71, we should be glad to have the names of builders who are planning to incorporate devices which will shut off machines if parts exceed tolerance limits and also adjust tools to remain within tolerances.

W. W. McKAIG
Cumberland Steel Co.
Cumberland, Md.

More details may be obtained from Sheffield Corp., Springfield & Thomas Sts., Dayton 1, Ohio.—Ed.

Home Study

Sir:

In the June 10 issue, on p. 75, you carried an article by R. M. Lorz entitled "Home Study: Helps Worker Up Ladder."

It is an excellent treatment of a subject which is, of course, of great interest to us. With your permission we should like to reprint the article in "The Messenger," a publication to our field representatives in the United States and Canada. Full credit would, of course, be given to THE IRON AGE and Mr. Lorz.

W. M. DONOVAN, JR.
Managing Editor, The Messenger
International Correspondence Schools
Scranton, Pa.

King Size Press

Sir:

Kindly mail us two tear sheets of the article "Heavy Press: Start Regular Output" appearing in your May 27 issue.

R. J. HESS
Vice President
Lake Erie Engineering Corp.
Buffalo

What does "S. B." mean to you?

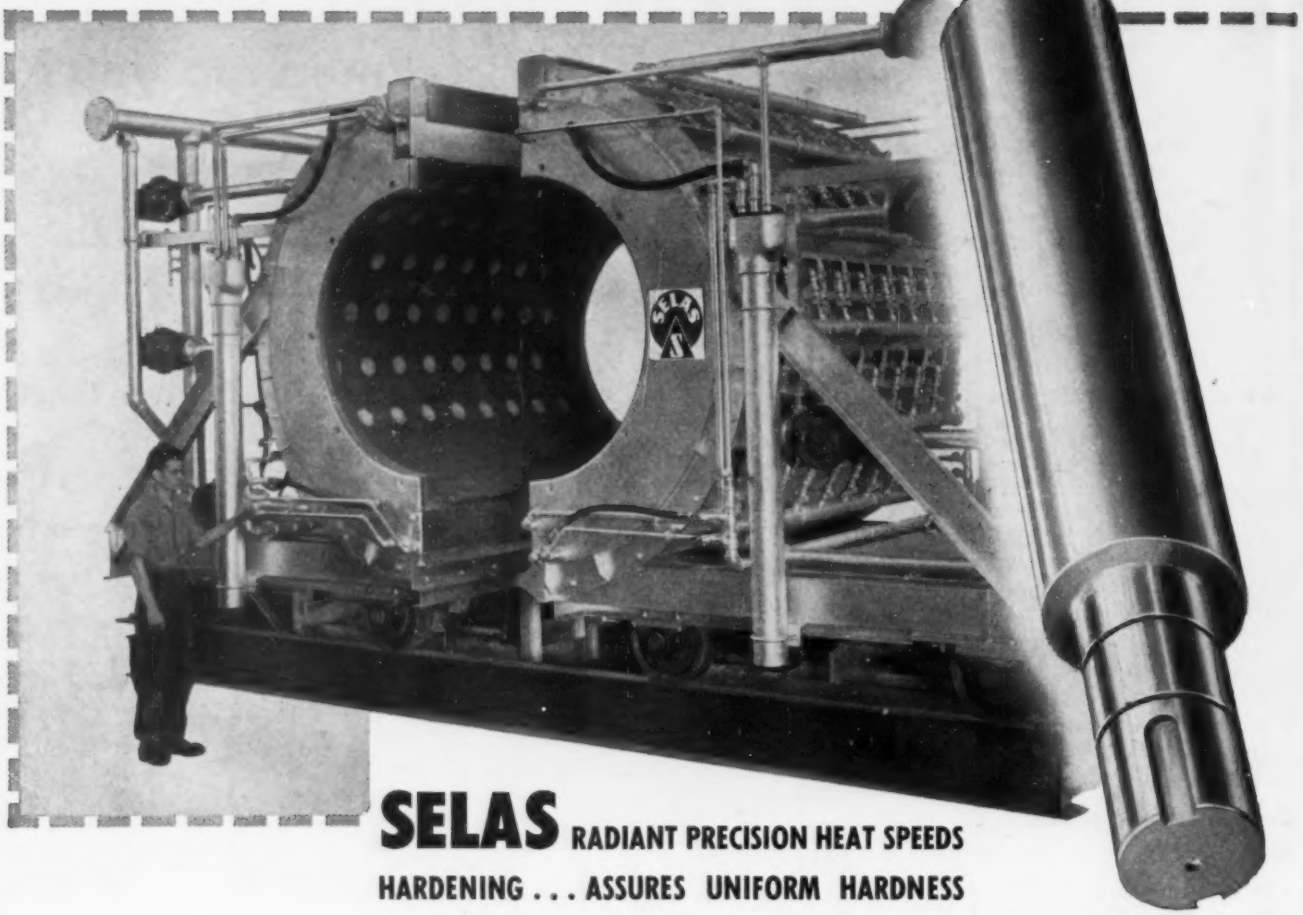
To some, it means "Soap Box" . . . the proverbial platform for platitudes. But, to thousands of designers and manufacturers, it means "Small Balls" by Universal, assuring true roundness and accuracy, so often despaired of in anything so microscopic.

Naturally, we make the larger balls, too, but we hope you'll get to know us through our Small Balls . . . a Sure Bet all around. Give us a chance to tell the Universal story.

Universal Ball co.

WILLOW GROVE
MONTGOMERY CO., PA.

ROLLS HARDENED
7 to 12 times faster



SELAS RADIANT PRECISION HEAT SPEEDS
HARDENING . . . ASSURES UNIFORM HARDNESS

Roll hardening has been speeded up 7 to 12 times faster than ordinary methods with the new Selas Radiant Heat Roll Furnace. Harmful scale eliminated. A uniform pattern of hardenability attained. The shoulders of the roll not affected.

Lined with Selas radiant heat burners this new gas furnace precisely patterns heat and hardens rolls up to 60 inches in diameter. Rolls are rotated during the heating and quenching cycles. When the heating cycle is finished furnace halves are easily rolled back on tracks . . . roll is quickly quenched. Result . . . no harmful scale formed . . . no soft spots.

Selas engineers working throughout the metal industry have speeded up heat treating, metal fusion, brazing, forging and other operations by scientifically applying radiant gas heat. Let them help you speed up your production, reduce costs and improve quality with Selas heat processing equipment . . . engineered to your production line. Write for booklet on radiant heat.

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Heat Processing Engineers for Industry • Development • Design • Manufacture

Fatigue Cracks

by William M. Coffey

Salute To New England

We think the editors did a pretty thorough job on New England with last week's issue. We were just a little disappointed, however, to see that they left out a few items. They didn't touch at all upon the largest, most bountiful of all New England products—the stones, boulders and rocks that grow like grass.

The editors also forgot to mention the absolute fact that no coastline in the world is as beautiful as New England; that the finest fishermen and seamen the world has ever seen came from New England, the ones who manned the most beautiful ships the world has ever seen—the Clipper ships and the Gloucester schooners also built in New Engalnd.

They also forgot to mention that we and Chet Ober, our New York regional business manager, attended Rogers High School, Newport, R. I. That one fact alone either makes or breaks New England, depending on your point of view.

Letters

Dear Mr. Coffey:

After reading the first few paragraphs of your offer to enroll me as a subscriber to THE IRON AGE, *I lifted up my eyes in despair and cried aloud, "Alas, I am not worthy!"*

I cannot even aspire to any of the positions which you list as qualifying a person for a place on so select a mailing list as that of THE IRON AGE.

Yet I am going to do a presumptuous thing. With all possible good will toward you and your publication, I am going to criticize your painful assault on the English language. An assault, in fact, with intent to maim.

The word which you have so ruthlessly trampled underfoot and crippled for life is "assemble" as used in the third paragraph of the enclosed letter from you.

"Assemble was an English verb of good repute. It meant, according to Webster's New Collegiate Dictionary, to collect into one place or body; convoke, congregate; to fit together the parts of. The verb "assemble" had a form in the progressive tense, "assembling," also of good repute, and a respectable noun cousin, "assembly."

In your letter, Sir, you had occasion to use the progressive form "assembling" a word admirably suited to your purpose. You did not use this word. Instead, you seized upon its poor trembling relative "assembly," and callously twisting and crippling it, forced it to serve you as a verb. You have thereby brought disgrace upon the whole "assemble" family. . . .

Very truly yours,
Lawrence F. Dewey

There was more to the letter, but it was all personal. We have a fond hope, however, that the editors will take note of our sin and replace us with someone who can better use the language. Just one more piece of evidence.

Dear Mr. Coffey:

It is too bad you have quit as we now will have to get used to someone else. In case your quitting hasn't succeeded to date you can make it unanimous by quoting the marked passage from a leaf which I enclose. I want to assure you that this type of material is used in a good many industries beside the steel business. Every iron foundry I used to know had a pile of foundry censored for uses like weights, etc. Hope you have to stay on the job because, having gotten used to you, I am beginning almost to like you.

Very truly yours,
Chas. C. Finn

This letter makes no sense at all unless you look on page 127, end of first paragraph, June 3 issue.

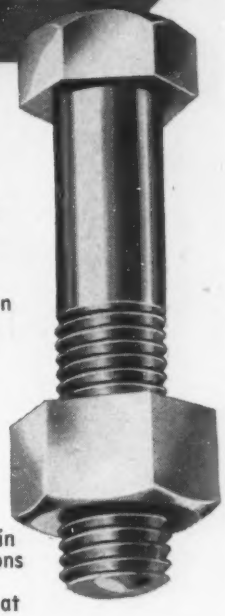
Puzzlers

Don't fret anymore over the June 10 puzzler. Something was left out. Try it this way: A debt of $1 million is retired in 25 years by making 15 annual payments of $77,600 each followed by 10 annual payments of $42,300 each. What is the interest rate?

. . . and if there's still something wrong with it, try this one: Find a 6-digit number such that if multiplied by 2, 3, 4, 5 or 6 the same digits as in the original number will appear in the results. If you multiply by 7 you will get a surprise. Contributed by C. W. Helstrom, Treadwell Engineering Co.

Uniform Class 3 Fit

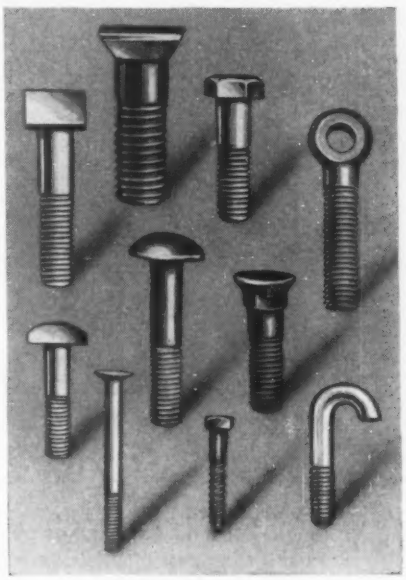
BOLTS
NUTS
STUDS



TITANIUM

- Carbon Steel
- Alloy Steels
- Stainless Steels
- Silicon Bronze
- Naval Brass
- Monel Metal

You can depend on a uniform Class 3 fit if required when you buy Pawtucket threaded fasteners. Standard items or specialties — all Pawtucket products are accurately made in standard dimensions or to your specifications. Heat treating with precision-controlled modern equipment.



BETTER BOLTS SINCE 1882

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.
"The Bolt Man"

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Sizzling sand poured on rubber

A typical example of B.F.Goodrich improvement in rubber

STEAMING hot sand, from molds used to make steel castings, is dumped on this belt every few minutes.

Ordinary belts stood the sizzling sand for only 30 days. A belt made of woven asbestos lived a short, simmering life of 60 days. But even during this brief life, the belt had to have "first aid" every week — a dressing to protect it from the heat.

The company was far from satisfied. They asked about rubber, but every salesman said it couldn't stand the terrific heat. Every salesman, that is, but one.

A B.F.Goodrich man told them that his company had developed a special heat-resisting rubber for belts carrying such things as hot sand, lime, nitrates. Instead of ordinary fabric, they used *glass* fabric to make a belt that can stand heat as high as 500° F. Put to work here, the BFG belt outlasted all previous belts. It performed for two years — a ripe old age for a belt in a busy foundry that works 24 hours a day, 7 days a week.

New and improved products, like this hot material belt, are the result of the B. F. Goodrich emphasis on research — finding better and more economical ways of getting things done with industrial rubber products. That's why it pays to keep in touch with your BFG distributor for the latest ways to save with rubber. *The B. F. Goodrich Company, Dept. M-258, Akron, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

A REFINED REFRACTORY CEMENT which resists penetration by molten aluminum has been developed. It's being used to line induction furnaces in which aluminum is melted. The cement produces a hard refractory wall which withstands aluminum's chemical activity, it is claimed.

LUMINOUS MARKERS for identification of military personnel and equipment have been made of radioactive strontium-90. The markers, which can be produced in a variety of colors, are said to be safer, brighter, longer-lasting than those containing radium.

STAND-BY CONTROLS FOR STEEL SCRAP are now being written. The old OPS schedule is being used as base but revisions aim to close loopholes, make orders more equitable. Indications are price ceilings would not be as high as under OPS.

ELECTRICALLY WELDED STUDS are being used to identify steel in process. Stud is welded to a billet and stays with the billet through rolling. Different stud shapes and sizes can be used to show the end of a heat or order or to identify a grade of steel.

PLASTIC PIPE is being used in salt wells in place of steel pipe. The noncorrosive plastic pipe breaks when well walls cave in. Previously, when cave-ins occurred, steel pipe was difficult to remove. Two well users report plastic pipe service life is triple that of steel pipe.

SCRAP DEALERS generally are undismayed by the possibility of a steel strike. While some distress tonnage would undoubtedly be shipped, relatively lean mill inventories seem to point to heavy volume, good prices following any shutdown of more than a few weeks duration.

A TREND TOWARD USE OF COLUMNAR-TYPE MACHINE TOOLS instead of in-line transfer machines for some mass production machining operations is indicated. Ease of maintenance and ability to retool in fairly short time are said to be factors favoring growing use of this type of design.

COLLOIDAL MOLYBDENUM DISULFIDE in an expoxy resin base is the newest wrinkle in lubricating materials. Lubricating films of these materials are reported to have good adhesion and wear-resistance, and can be used at temperatures to 500°F.

RAPID GROWTH OF POWDER METALLURGY is bringing new materials with improved processing and finished part properties. A recently developed reduced-oxide type iron powder is being used successfully for mechanical parts requiring high tensile and transverse strengths and good wear resistance without unusual ductility.

NEW SEMICONDUCTOR MATERIALS with high electrical conductivity and low thermoconductivity are being sought by a British research group for use in refrigeration. Using a long known, little used principle, a cooling effect of nearly 50°F has been produced by passing a current through the junction of two dissimilar metals. Silicon and germanium were used.

Hands Off!

EC&M TAB-WELD RESISTORS REQUIRE MINIMUM MAINTENANCE

Only EC&M TAB-WELD Plate Resistors are both bolted and welded for constant current path. Unlike other resistors, they do not require periodic tightening of clamping nuts to compensate for loss of pressure caused by alternate heating and cooling. In TAB-WELD Resistors, grids are offset and mating ends spot welded. Tap-plates are also welded into place at close intervals along the grid assembly.

This exclusive EC&M construction offers these outstanding advantages: (1) stabilized ohmic value, (2) no burning at grid-eyes or at tap-plates, (3) easy tap-shifting for best motor performance, and (4) long life with negligible service.

So . . . hands off EC&M TAB-WELD Plate Resistors . . . they are constructed for dependable performance on heavy duty motor applications . . . with minimum maintenance!

CHECK THESE ADVANTAGES!

- Nonbreakable
- Corrosion-resistant alloy steel
- Negligible resistance change between cold and maximum working temperatures
- Offset resistor ends spot-welded
- No burning at grid eyes
- No burning at taps
- Small adjustments in resistance value easily made
- Insulating spacers remain dimensionally stable
- No periodic tightening of clamping nuts
- All standard sections same size
- Double insulation to ground
- Fast connection to any tap plate

Write today for illustrated Bulletin No. 942-B for complete data on EC&M TAB-WELD Resistors.

1794

THE ELECTRIC CONTROLLER & MFG. CO.

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FOUNDRIES: Business Picks Up But . . .

Volume will be 10 pct lower than '53—even if a new boost comes in fall . . . Building boom a boon . . . Railroad business dead . . . Many boost scrap use—*Staff Report.*

Foundry business has picked up noticeably. When statistics are finally compiled they will show second quarter business gained substantially over first quarter. But in neither the first nor second quarter could foundry business match the pace of a year ago.

This is indicated by a foundry business check by IRON AGE editors in major industrial centers across the nation. On the basis of many interviews it is believed that for the year as a whole foundry business may be off about 10 pct from the 1953 level. This assumes a pickup in the fall.

There is a striking similarity in the shipment curves of gray iron, steel, and malleable iron founders. Bulges and dips are generally marked up by all three at about the same time.

Customers' Business Mixed

But there are very wide fluctuations in business of individual founders. Some told THE IRON AGE they're doing quite well, while others said that business is lousy. How a founder is doing depends upon who his customers are.

Many of those supplying the building boom are doing fine. Agricultural demand perked up for a while, but is beginning a seasonal sag now. Automotive demand is fair. Railroad demand remains flat on its back.

Many foundries have been shaving costs by increasing their scrap to pig iron ratio when they can get quality material. And this has been keeping the cast iron scrap market firm in recent weeks.

There has been no price cutting among pig iron producers. But they have been absorbing freight. And some eastern founders have been buying foreign pig at as much as $12 a ton below domestic prices.

Foundry customers are acting like steel customers—working off inventories, ordering small quantities, and demanding and getting speedy delivery. They are sticklers for quality, too.

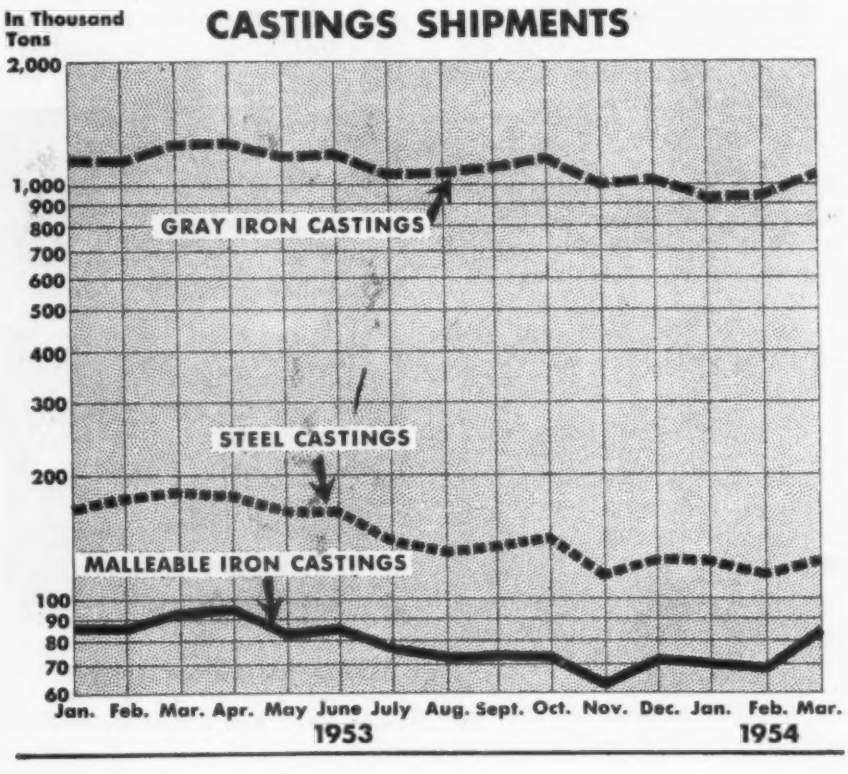
Reports from individual industrial centers show some similarities, but also some sharp differences. Following are condensed reports on foundry business from THE IRON AGE regional editors.

Cleveland Expects Upturn

Foundry business is still sour in the Cleveland area but not bad enough to make any one want to throw in the sponge. Overall drop in all three segments of the industry averages out to between 12 and 15 pct for the first half compared to similar period last year. Upcoming third quarter will probably cause some anxious moments as vacations and perennial summer lull supply the acid test.

Founders in this area generally look for better things in the fall. When pressed for reasons they frankly admit, however, that so far they haven't got much to go on except the slow comeback industry in general has been experiencing during the past few months.

One thing is certain—if an Indian summer revival is destined to become a reality, automotive demand will have to show a definite improvement. Gloomy independents who found the Detroit cupboard bare during second quarter



have no backlogs, constantly complain that the trickle of orders is for small quantities and delivery yesterday.

Producers willing to predict what kind of year '54 will be generally believe it will average out at about 10 pct below last year. If their guesstimates are too optimistic (i. e., automotive doesn't show some life; if expected increase in freight car building proves a dud and if machine tool demand remains slack) a drop of at least 15 pct and the worst year since '49 is expected.

Nothing much has happened within the past 12 months to disturb the normal relationship prevailing in use of merchant iron and cast scrap. Giants in the industry, who sometimes charge as much as 80 or 90 pct scrap, have naturally taken advantage of price fluctuations in isolated instances.

Despite a recent increase in cast scrap prices some firms admit to spot savings of from $10 to $20 per ton. These admissions are made in private to prevent a consumer campaign for proportionate pass through. But some producers hesitate to disturb controls and the continuity of mix formulas.

Up and Down in Pittsburgh

Picture around Pittsburgh definitely is not healthy, although there are some bright spots. People here figure the low point was last December. A pickup materialized in January, February, and March, but dropped again in April, picked up slightly in May and has now leveled off. July is expected to be poor due to vacations, when virtually all foundries will shut down for varying periods.

As an example, one foundry has run only seven heats since Apr. 1. Production is probably down to about 10 pct of level before current recession set in. This company depends largely on railroad business.

Bright spot is the building boom. Pig iron sales to foundries making plumbing and heating equipment are good. Demand for agricultural equipment castings is sagging again due to seasonal influences after a pickup several months ago. Due to early model changes, automotive demand is off. Demand from electrical industry is only fair.

Some jobbing shops are doing well, particularly those dependent on building. A pump producer who formerly depended largely on the farm trade is busy supplying demand for deep well pumps due to suburban house developments.

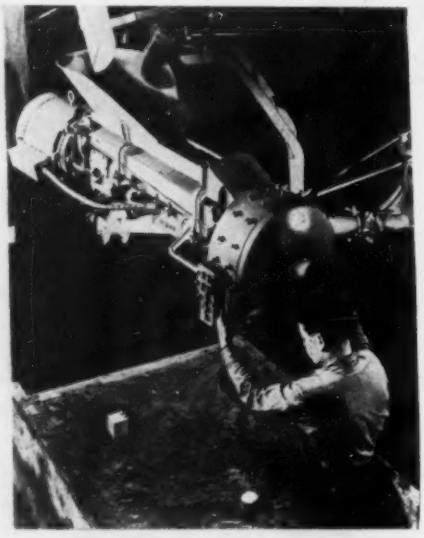
Pig iron producers told THE IRON AGE that business is competitive and they are absorbing freight but not cutting prices yet. One says it's limiting amount of freight absorption by turning down business too far afield.

Before the war the firm had 15 accounts in Cleveland, but won't go that far now because it can't afford to absorb the $5 per ton freight.

Foundries are increasing scrap to pig iron ratio only where the end product justifies it. Quality of cast in the district said to be so poor that regardless of price a foundry making a quality product can't afford to take a chance.

Dies Bright in Detroit

It's a rare foundry in the Detroit area that can point to a 5-day week. Exceptions are isolated ones that happen to be supplying one of the booming auto companies. Those who happen to be major suppliers of those not booming, obviously are in a much worse condition.



STEEL liners made of M-Alloy by Beardsley & Piper are reported by foundries to give longer life in slingers.

Automotive dies are probably the brightest spot in Detroit. Some of the die programs for 55's are completed, or nearing completion, but others are just coming into their own.

One foundry that makes a lot of castings for railroad cars is down to 3 or 4 days a week. An outstate foundry making auto parts and other gray iron castings is down to 3 days.

One of the biggest malleable iron foundries in the Detroit area is on a 3-day week. It was 4 days a month ago and 5 days 6 months ago. No sudden pickup is expected by this company's spokesman.

In general, business is not as good as 6 months ago, but significantly better than a month ago.

Easterners Heavy on Scrap

Foundry business in the East is characterized generally as "terrible." Activity is lower than it was in 1953—which was also a poor year—and it hasn't shown any response to the current slight upturn. Activity has been at about a constant level all year.

Lower prices for cast grades of scrap have been more attractive to foundry purchasing agents than pig iron prices with the result that melt ratios are heavy on scrap where possible. This is especially true of the cast iron soil pipe founders—one of which is reported to be using 90 pct scrap, 10 pct pig.

At least one foundry is making arrangements for scrap delivery during the vacation shutdown.

Foreign pig is selling $12 a ton below domestic prices. But many founders prefer to stick to the domestic product in spite of possible savings.

June Better in Chicago

In the Chicago area foundry business for June has been good. June is the second best (March was best) month so far this year. And second quarter is the better

of the two quarters this year. Sharp dropoff is expected in July, with most foundries closing for 2 weeks. An upturn is expected perhaps as early as August.

Although business is sluggish, foundrymen report inquiries for August delivery are increasing.

Like many other metal consumers, founders have been working off inventories. Pig iron stocks are believed to average about 30 days. And some big customers who have been out of the market are buying again. One volume customer came in for tonnage recently for the first time in 6 months.

Founders believe inventories of their customers are very low. But orders are still small and spotty. Order backlogs are scant.

Work weeks run 3 to 5 days, but more are in the 4 to 5 day bracket than at any time since March.

Business for the first half is estimated about 15 to 20 pct below last year. Some of the same sources were talking about a 25 pct difference back in February.

Speed Western Deliveries

Western founders report some improvement in busines after experiencing a severe slump from November until May. Agricultural demand continues to lag. But an upsurge has been felt in pipe, plumbing, sewage construction, and construction equipment materials.

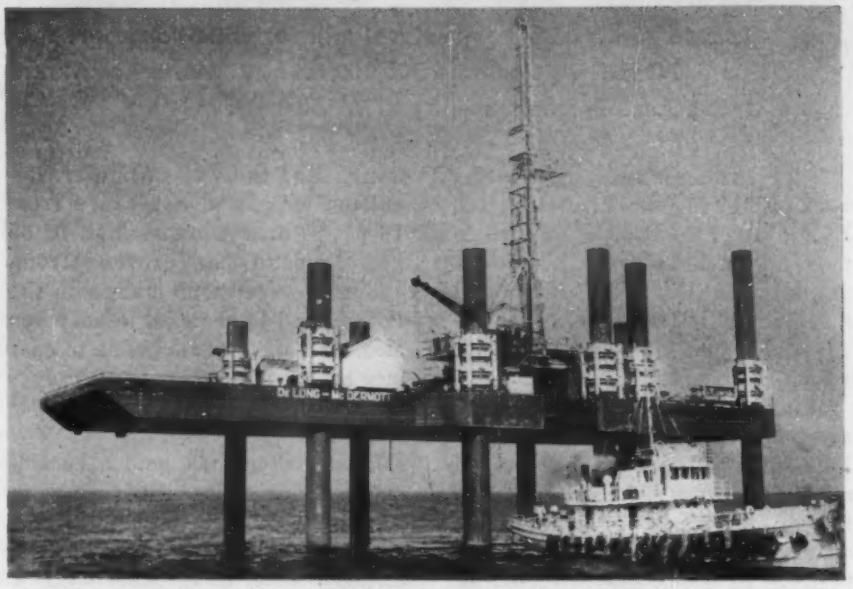
Many manufacturers have whittled inventories drastically. And founders are promising and making delivery in 10 days to 2 weeks compared to a month last year.

Cast scrap is scarce because steelmakers aren't buying scrap and wreckers won't scrap autos for cast alone. Some West Coast founders have been pulling cast in from as far as Idaho and Arizona with freight bills up to $11 a ton.

Many expect increasing costs to push foundry prices higher. But each is hesitant to move first because of the low level of business. Some, with an eye on slim profit margins, are thinking about cheaper foreign pig iron.

Three western blast furnaces are out of service.

Use Dock-Barge in Gulf Oil Drilling



LIFTED into position above the Gulf of Mexico, the dock is claimed capable of withstanding heavy winds. Note double jacks.

Mobility plus stability in offshore drilling are the major advantages claimed for a new unit which recently went into service for a major oil company in the Gulf of Mexico. Unit is a DeLong dock-barge specially rigged for oil drilling.

Basically, it's a 203 x 70-ft steel barge 8½ ft deep mounting a series of special jacks on the deck. By means of the jacks, the 2500-ton barge pulls itself up 40-ft out of the water on ten 160-ft-long steel caissons, converting itself into a stable drilling platform.

Fabricated by Consolidated Western Steel Div. of United States Steel Corp., unit is leased by DeLong-McDermott Co. to the oil firm.

Forward deck provides a helicopter landing space as well as crew quarters. Drilling equipment is aft on the port side and functions through a 12-ft slot in the unit's side. Slot permits the barge to be swung away from the drilling well when it has been completed. Internally, the hull is honeycombed with steel ribs for strength. Storage space is provided in the interior for fuel, oil and water.

Each half of the unusual air jacks is lined with rubber tubes. Similar, tire-like tubes circle the caisson between sections. Tubes 6 in. above the deck are inflated, gripping the caisson. Air is pumped into the tubes between the sections which forces the caisson downward. Inflating the top tubes then clamps the caisson with the barge at its higher level and the bottom grip is released. Retraction here climbs the barge still higher. Center tubes are next deflated and the operation starts anew. Reversing this cycle lowers the dock.

JACK and caisson on deck of similar barge. Air-operated, the jack "shinnies" up the caisson.

STEEL: Inland Eyes Wide-Flange Market

Plans to rework 28-in. structural mill for wide-flange production . . . Capacity would be 325,000 tons . . . Market continues strong . . . Shipments up—By *K. W. Bennett.*

With wide-flange structurals continuing in excellent demand, Inland Steel Co., Chicago, plans to move in on this market. Last week it indicated its 28-in. structural mill would be reworked over an 18-month period to adapt it to wide-flange production.

Inland, which is expected to reach 5 million ton ingot capacity by 1955, believes the revamped mill will have a 325,000 ton capacity of 8- to 24-in. wide-flange beams annually, depending on the tonnage of other products coming from the same mill. Roll changing time will require little more than 1 to 2 hours.

Wide-Flange Remained Tight

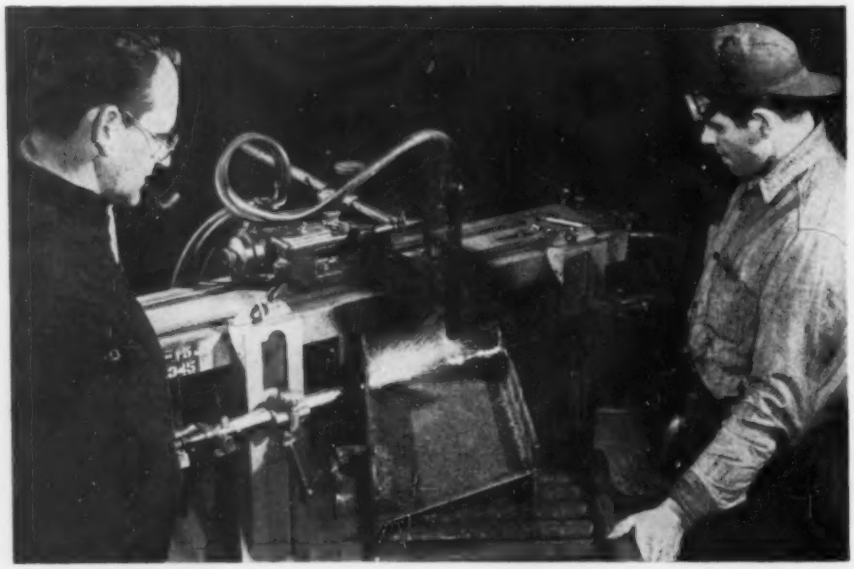
Current producers of wide flange beams include U. S. Steel at its Homestead, Pa., and South Chicago works, Bethlehem at Bethlehem, Pa., and Lackawanna, N. Y.; Kaiser Steel Corp. at Fontana, Calif., and Barium Steel Corp. at Phoenixville, Pa.

Wide flange differs from standard structural in that it has a straight, rather than a tapering flange, and the web is lighter. Resulting weight savngs range from 10 pct to an estimated high of 35 pct. Demand has proven strong enough to keep wide-flange on the list of hard-to-get steel items when standard structurals began to ease late last year.

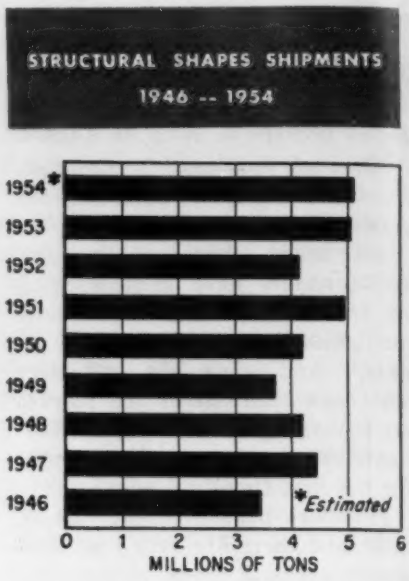
Shipment Ratio Rises

Inland Steel has held a certificate of necessity covering construction of a wide-flange mill since March 1952. And also in the Chicago area, U. S. Steel holds a certificate of necessity covering a structural mill change, but no appropriations have been made covering such construction. The 52-in. wide-flange mill already in operation at the South Chicago works of U. S. Steel is rated at 586,900 tons, according to a company spokesman.

It has been reported that roughly 50 pct of the nation's structural capacity is wide-flange and this ratio is expected to increase. Also, as percentage of total steel shipments, deliveries of all types of heavy structurals are increasing.



CUTTING MACHINE at Luria Engineering Co., Bethlehem, Pa., cuts structural steel four times faster than saw with acetylene-oxygen flame.



In 1946, 7.1 pct of steel shipped was in the form of heavy structurals. The figure slipped to a low 5.8 pct of total output in 1950, began climb and hit a high 7.9 pct in the first 4 months of 1954.

Running Ahead of '53

High point in postwar structural steel shipments was last year's 5,022,012 tons, but 1954 may top this figure (IRON AGE estimate for '54 is around 5.1 million tons). American Iron and Steel Institute figures show that heavy structural shipments during the first 4 months of 1954 were running about 105.2 pct of shipments in the same period of 1953. This is an increase of 87,944 tons.

It's Inland's hope that if there is another severe shortage of structurals, particularly wide-flange beams, such as there was early in 1953, its revamped mill will enable it to satisfy at least part of the demand.

J & L Building Research Facilities

Jones & Laughlin is putting up research and development facilities in South Pittsburgh adjacent to the steel plant. These facilities will be used to carry on research on ore beneficiation and on studies of coal and other raw materials. Idea is to work out techniques to improve J&L production. Construction has begun and will be completed in a year.

SAFETY: Contests Cut Accident Rate

Steel firm finds contests bring 44 pct drop in lost-time mishaps . . . Frequent rewards spark employee interest . . . Need safety education, plant conditioning too—By *G. J. Neumann.*

To most management men faced with the decision to authorize a safety contest the basic question is not whether any good will be accomplished, but how much good.

They want to know "Will we get enough lower frequency and severity rates to justify expense of running safety contests?"

The answer found at Lehigh Structural Steel Co. was a very definite affirmative.

Here is the record: From October 1939 through October 1953 there were 100 months during which Lehigh did not hold safety contests. Frequency rate during those months averaged 6.01 lost-time accidents per million man-hours worked, and severity rate was 1.100 days lost per 1000 man-hours worked.

During 68 months of the 14-year period Lehigh conducted safety contests. While these contests were running the frequency rate averaged 3.45 accidents per million man-hours and severity rate averaged 0.615 days lost per 1000 man-hours.

Experiment Proves Effective

During the safety contest months accident frequency rate was nearly 43 pct below the period when employee interest was not stimulated by contests. Severity rate was 44 per cent lower. However, the current showing is even better than that. Between October 1953, close of 14-year survey period, and the present date, Lehigh employees have worked 217 consecutive days without a lost-time accident.

Lehigh's safety record has not always been as good as it is today. In fact, it used to be terrible. The company began to keep records on frequency and severity in 1924. For the period 1924-27, company's accident frequency rate was 61.3 per million man-hours worked, and severity rate was 7.35 days lost per thousand man-hours worked. Management could not tolerate this situation, and took decisive steps to improve safety performance.

Lehigh did not hold safety contests at first. An intensive safety education program and constant efforts to maintain good housekeeping and safety conditions throughout the plant, however, brought about a marked improvement. From 1928-31 accident frequency rate averaged 13.7—only about one-fifth as much as in the 1924-27 period. Severity rate dropped down to 0.98, an even greater improvement.

For a number of years Lehigh followed the plan of giving each employee an award at the year's end for accident-free performance during the 12 months. This scheme emphasized reward at the end of a long period for safety performance completed. Coupled with the company's regular accident-prevention and safety education program this scheme enabled Lehigh to chalk up a record of 8½ years without a lost time accident.

George J. Neumann
Vice-president and plant manager, Lehigh Structural Steel Co.

But eventually the reward system lost its effectiveness and the accident frequency rate crept back up to 4.47 per million man-hours and severity rate stood at 0.0823 days per 1000 man-hours.

Award Frequent Prizes

After much discussion, Lehigh's safety council decided that an award only once a year was insufficient incentive. So the company changed its policy from making an award after a record was established to one of making awards to establish safety records.

A contest with war savings stamps for prizes was run in July 1942, and another in November 1943. Frequency rate dropped to 0.95, while severity rate stayed virtually constant at 0.0823.

From August 1949 to the present Lehigh has run safety contests almost continuously. Contests have taken several forms, giving small, frequent prizes for safety slogans, suggestions for safety improvements or for number of accident free days worked.

No Wild Cards

One of the most successful contests used was Safety Poker. Workers were given special playing cards, chosen at random, for safe periods worked. After a number of cards were passed out, prizes were given for best poker

How to Run Safety Contests

1. **Type of contest and method of handling should be adapted to the individual plant.**
2. **Contests must stimulate interest, and must be fun.**
3. **Contests should be run by a committee composed of supervisors and other employees.**
4. **Type of contest should be changed from time to time, but should run continuously.**
5. **Contests should always offer a number of individual prizes.**
6. **All employees, shop, office or drawing room should participate.**
7. **Contest should be promoted vigorously and publicized in company's house organ.**

hands, such as straight flush, royal flush, full house, etc.

Contests can cost a little or as much as desired. Safety Poker contest cost the company $100 per week (for 500 employees) while it was running the first time in 1949. Lehigh is presently operating on a contest budget of about $1,000 per year.

Many employees work safely because they realize that accidents not only result in personal suffering and loss of pay, but also reflect on their efficiency and ability. Other workers may not think through these reasons for avoiding accidents, but interest in competitive safety contests can persuade a great many more of them to co-operate in developing and keeping safe habits.

However, contests are only a means to an end. There are no substitute for daily watchfulness and continuous safety education. Lehigh knows the job will not be finished until all its workers are safety-minded to the point where they work safely, not to avoid discipline or to win prizes but for the benefit of themselves and their co-workers.

Accidents:

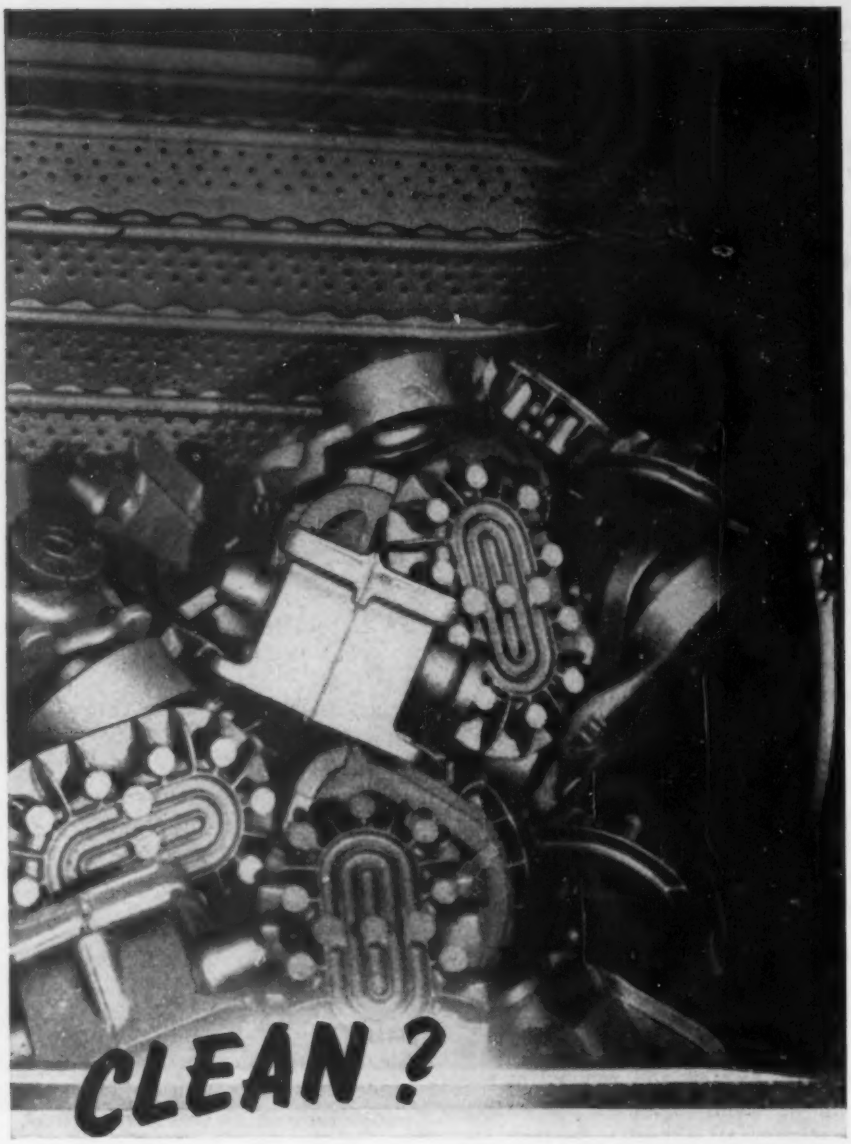
Plant injury rate declines from record low in '53.

Injury frequency statistics just disclosed by U. S. Labor Dept. indicate that 1954 will be a better year for plant safety than 1953, itself a record year.

Disabling injuries in blast furnaces and steel mills, for example, dropped from an annual average of 5.8 per million man hours worked in 1953 to 4.7 in first quarter 1954.

This compares with the all-manufacturing rate of 11.8 in the first quarter, itself a new low.

Of nine industries in the primary metals field, only two found their injury rates higher in the first quarter than in the same period of 1953. These were wire drawing, up from 10.2 to 10.8, and cold-finished steel, which advanced from 15.1 to 16.



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STEEL: Contract Will Up Price $3-$4

Agreement will cost steel companies 10¢ to 12¢ per hour . . . Steelmakers will not be able to hold price line . . . Details on negotiation pattern—By J. B. Delaney.

The 1954 steel labor settlement, revealed this week, adds up to a total package covering wages, pensions, and insurance of between 10¢ and 12¢ per hour.

Compensating steel price increases, held to a minimum in a competitive market, will average between $3 and $4 per ton. Last year when the labor settlement amounted to 8½¢, prices rose an average of $4 per ton.

The agreement which included about a 5¢ per hr wage increase for the steelworkers is in line with earlier predictions.

For additional details on steel settlement see p. 145.

The industry fought a losing battle with the United Steelworkers in its efforts to hold concessions to a minimum that would permit absorption of the additional cost without raising prices. Initial offer to the union amounted to 4½¢ on wages and insurance plus a $30 per month increase in the minimum pension for 30-year employees.

Final details of the agreement were hammered out at meetings in Pittsburgh Monday night, although a general area of agreement had been reached during last weekend.

Stripped to the essentials, 1954 steel labor negotiations followed the only logical pattern considering the issues involved and competitive market conditions in steel.

No one took the United Steel Workers' original, far-reaching proposals seriously. Even the union admitted most of the demands were long-range rather than immediate objectives. They were put on paper largely to satisfy rank-and-file union members.

U. S. Steel's initial counter-proposal, a "package" that would have increased costs 4½¢ an hour exclusive of pension plan improvements, was based on the hope of achieving a settlement that would have averted an immediate price rise.

Under Pressure

Steel producers clung to this position to the point where they had the alternative of boosting the ante or risking a strike. They were under pressure from customers who already were shaving costs by forcing the mills to absorb freight costs to meet competition. But eventually they had to yield.

While it was not necessarily a foregone conclusion that the initial proposal would be turned down, even the most optimistic were keeping their fingers crossed. Union rejection came as no great shock to most observers.

Circumstances surrounding the union meeting at which the offer was disdained led some to conclude that the impasse was more serious than actual developments warranted. This impression was encouraged by unofficial union observations on the status of negotiations.

David J. McDonald, USW president, used strong words at the meeting and some of them were overheard by reporters in the corridor outside. Some of these remarks found their way into newspaper stories. This tended to exaggerate the feeling of impending trouble.

But Mr. McDonald was not nearly so severe in his comments at a press conference following the meeting. And later developments brightened the outlook considerably.

Somehow lost in the shuffle was the obvious fact that Mr. McDonald was addressing a closed meeting. His remarks were intended only for his own people—not for public consumption.

Wanted Better Package

It was natural for the union to turn down the initial proposal. They felt that improvements in the 5 year old pension and insurance programs were long overdue. They also wanted a wage increase. Competitive conditions in the industry were taken into account but union leaders nevertheless insisted that a "package" better than the original proposal was warranted.

After a "cooling off" period of several days, the industry proposal acceptable to the union was laid on the table.

New Steel Contract Settlement Means This:

TO CONSUMERS: Average steel price increase forced by the settlement will be $3 to $4 per ton. Some prices will be upped less than $3, some more than $4. Prices likely to be raised within the week.

TO PRODUCERS: Cost to steel companies will amount to between 10¢ and 12¢ per hour.

TO STEELWORKERS: Wage increase amounting to about 5¢ per hour, plus fringe benefits.

Workers Strike At Great Lakes

Last week while the rest of the industry waited as the contract deadline approached, Detroit's largest producer, Great Lakes Steel Corp., was in the throes of a full scale strike.

This division of National Steel was hit by what the company called an illegal strike, arising out of two minor incidents that occurred almost simultaneously in an openhearth shop and a slab yard.

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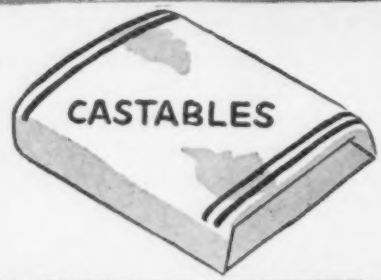

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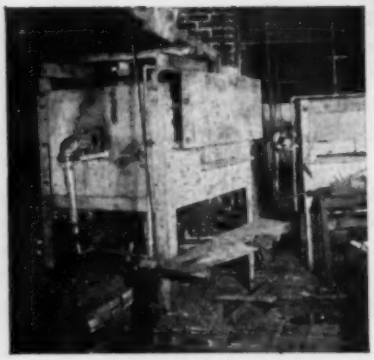

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Purchasing agents still optimistic • • •

Industrial purchasing agents were among the first to note a levelling off in the business decline last March, and in June they saw nothing to indicate their original mildly optimistic view was incorrect. Report from National Assn. of Purchasing Agents indicates June production has inched up over May and there are sufficient new orders to cover the production increases. Some of the new business is attributed to advance orders to cover requirements while supplier organizations are on July vacations.

Inventory Cut Continues

On inventories purchasing agents say the slight indication in May that stocks of unworked materials were stabilizing was not evident in June. Inventory reduction is continuing at about the same rate as earlier in the year.

Reason for this trend is midyear inventory taking, vacations, ready availability of supplies, stress on turnover. Possibility of a steel strike was pretty well discounted by large steel buyers and did not cause any appreciable increase in inventory buying. June employment is regarded by purchasing agents as little better than in May, but much improved over January. Many industrial workers who were laid off are finding outdoor work but students are having trouble getting jobs, and a ripple of cutbacks on government orders is causing some new unemployment.

Purchasing agents report no change in the conservative 60-day policy which has been in effect for months. With most materials easy to come by and inventory curtailment policy continuing, the short range procurement policy is expected to follow through the summer.

Prices Are Stable

The PA's say stability characterizes commodity prices. Lowest number for the year report price decreases outbalanced by increases. With more time to negotiate because of the easy supply of most materials, buyers are finding it profitable to encourage broader competition.

Little interest is indicated in the possibility of increased steel wages setting a general pattern for price increases, the association states.

• • • but factory stocks remain a problem • • •

Retailers are slowly whittling away their large inventory stocks, but factory inventory of finished goods is still mounting, leading some manufacturers to wonder when the promised upturn is coming.

Retail inventories have been reduced 3 pct, from $22.9 billion to $22.6 billion, since they hit a peak last September. During the same period, however, factory stocks of finished goods climbed by $400 million and now top $17 billion, new government statistics show.

Expect Upturn

Administration officials, too, are beginning to wonder. Federal Reserve Board, following the Administration theory of using fiscal boosts to help business help itself, has cut bank reserve requirements, pumping an estimated $9 billion credit transfusion into the national economy.

The Board explains the cuts are made to meet an "anticipated" demand for credit from businessmen replenishing stocks in the early fall. FRB is concerned about unemployment and believes an inflationary push might help the economy steady itself into a more solid upturn.

Durable Sales Are Off

Answer to the business puzzle lies in a spending shift. Consumer disposable income and spending, primed by recent tax cuts, remain at or close to peak 1953 levels. Difficulty results from public spending cash for nondurable goods, while remaining cautious about contracting new installment debt for hard goods.

Sorest spot in the business decline has been sales of durable goods, which dropped 15 pct below first quarter 1953 levels early this year, but have now recovered about half that loss. Most of the dip is attributed to weak auto market.

At current inventory-sales ratios, it will take until the end of August to bring retail inventories to the level of April, 1953. When this point is reached, the door could be opened for a break in merchants' ordering that might melt manufacturers' stocks and lead to the end of that phase of the recession. Naturally, the buying public will have to provide the stimulus.

Conservative Buying Policy

Businessmen have been following a "conservative" inventory policy, reducing working inventory—goods ordered for future delivery and in transit—which has kept whatever stock reductions they accomplished from seeping back to the manufacturing level.

But easier credit, increased consumer confidence, are expected to spark a rise in installment buying which will put new life in durable goods sales and increase orders to manufacturers and materials suppliers.

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Titanium:

Tests on new alloy continue . . . See armor, turbine uses.

A titanium alloy that after proper heat treatment, has given tensile strength up to 192,000 psi in limited testing has been reported by Col. B. S. Mesick, commanding officer of Watertown Arsenal, Watertown, Mass. The alloy, a titanium-aluminum combination with beta stabilizing elements, was developed by Armour Research Foundation.

Tensile strength figure means that the alloy would be a suitable replacement for steel in manufacture of many weapons, with weight savings of up to 40 pct.

Air Force May Use It

The material marks a major accomplishment in a 3 year titanium research program and the present announcement follows about 7 months of testing on alloys of this particular type. At least one 1000-lb commercially produced ingot of the alloy has been shipped for further testing and other large ingots have been ordered. If test results confirm expectations, it is probable that general specifications for the material will be ready in 4 months.

Initial testing was with 20-lb plates, suggesting that armor applications for the material are being strongly considered. Air Force is also believed to be considering the material, which can be prepared in sheet, ingot, or billet form, for high temperature engine applications.

Testing to date has been largely aimed, for Ordnance use, at tensile and impact properties. Initial reaction to the new alloy seems cautious—a "wait and see" attitude. Rather than overbill the qualities of the titanium alloy, observers seem to seek considerable more testing before discussing field application of the material. A possible reason is that laboratory quantities conceivably could out-perform mass commercial batches.

FATIGUE: ASTM Hears New Theory

Hard metals may soften, not work-harden under cyclic loading, say researchers . . . Others interested, skeptical . . . Suggest new, faster testing methods—By *K. W. Bennett.*

Physicists, metallurgists and engineers are closing in on metal fatigue, if papers and corridor discussion at the recent Chicago meeting of the American Society for Testing Materials were an accurate indicator. But the problem is far from final solution and scientists are finding some dissension in their own ranks.

The opening within metals under repeated stress of minute fissures that expand and join to form larger cracks, with the metal finally failing under relatively low applied force, has long been associated with some kind of work-hardening in the metal. In theory, the metal around the expanding fissures becomes work-hardened under repeated stress, though work-hardening itself is not called a cause of fatigue.

Others From Missouri

Last week came word that in cold-worked metals, there's sufficient data to suggest that metals lose their elasticity, become more semi-plastic than they do hard. The cold-worked metals become soft, not hard; initially soft, unworked metals become hard as was believed in the past. Carrying this even further, it's proposed that there may be a definite hardness value toward which a given metal will progress under repeated loading.

The work-hardening school was attentive, but not fully convinced. As a research chief for a university department that has long chipped away at the problem of metal fatigue admitted cautiously, "We're interested in the data, but we're not sure that we agree with the conclusions."

The investigators studied copper, nickel, aluminum, several of their alloys, and titanium-killed steel, before announcing their findings. Their belief is that cyclic plastic flow in the cold-worked metals would more easily allow joining of sub-microscopic openings in metals, and these would enlarge into the embryo cracks that cause eventual failure.

Need More Research

One of the most critical struggles against metal fatigue has been in fighter plane construction. In dive-bombing and strafing, planes often exceed the load limit for which they were designed by 20 times. In another investigation, sample wing panels were tested to destruction under a repeated-load system designed to find where fatigue was originating, how long it takes to become dangerous.

One conclusion is that it may be possible to predict, after initial fatigue cracks in such a complex structure begin to appear, how many cycles of repeat-loading will be required to bring on complete failure. It's been claimed, although not verified at the conference, that the British have an intensive program along these lines that is already being applied to fighter plane construction.

But with fatigue of complex structures even more an unsolved enigma than single parts, the wing tests brought sharp attack. One is that basic metals used in forming complex parts have to be more thoroughly understood before conclusions as to rate of fatigue advance in a finished wing can be predicted with any safety.

"If there's one thing I can't stand, it's a critic who knows his business."

Two more weapons were available for the approach to fatigue. One of the toughest laboratory problems in fatigue study is the long time required to break down a metal bar, produce failure through fatigue. Some, the "run-outs," never do break down in the life of the experiment. Again, vast numbers of samples may be necessary to get an average that indicates representative fatigue development in a specific alloy of a specific shape(and it's accepted that shape and size of the specimen tested can also affect results).

Suggest Faster Technique

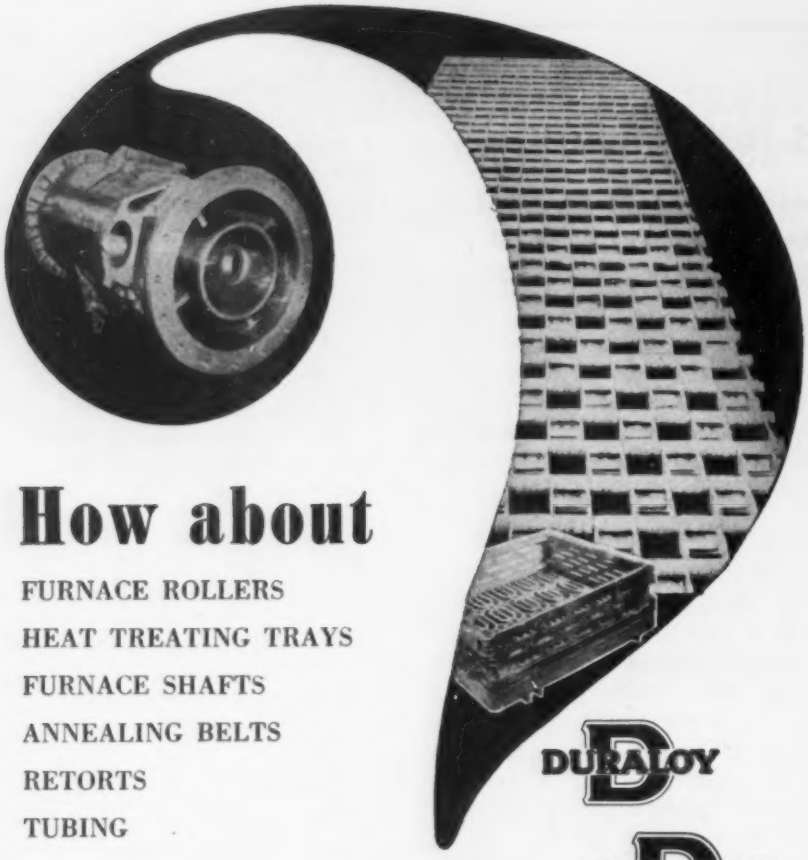
The Prot method, announced in 1948, was rechecked and further verification of its results given. The Prot method reduces the number of specimens required and the length of time for each test. Besides this, a "least-of-four method" for checking design-level fatigue should be of aid.

Aimed for use by an average laboratory technician, this calls for testing of four-single batches; say four steel bars, and the testing extends only as far as the first failure per batch. Resulting "least-of-four" value can be used to plot a curve that 84 pct of subsequent specimens will exceed in life. In testing, series of "least-of-four" points are obtained to produce a curve. With the savings in testing machine time and manhours, the method, as with Prot, will attract interest.

Must Know Why

Considerable work in fatigue has been accomplished with the lighter metals, aluminum in particular, and with the beginnings in February of an ASTM subcommittee on aircraft structural problems under the fatigue committee, the pressure for more light metal fatigue data can be expected to grow.

Researchers have closed in some-



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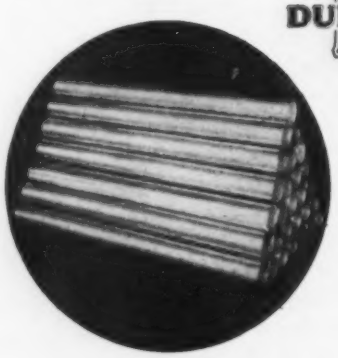

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what, and some of the newer test methods have improved their chances. But the basic understanding of fatigue is still elusive. Said one manufacturer of testing equipment, "No we're not hoping for anything that will locate fatigue in the field earlier. Our research department is going back to basic research. Before we can lick fatigue, we've got to know more clearly its beginnings."

No Change in Testing

A metal research director who has gained considerable reputation in metal fatigue study agreed. "I can see no testing equipment coming along, at least right now, that will change our approach to fatigue in field testing. Even with destructive testing, using the electron microscope, we haven't hit the full explanation of how it begins and progresses. There are methods that will catch fatigue, say in a railroad car axle, a long time before it becomes dangerous. But we've still got to get back to its starting point, and that calls for basis research."

Still Lack Solution

The aircraft wing tests announced by Bureau of Aeronautics suggest that applied knowledge is producing results. New testing approaches suggest an acceleration in basic research. But the problem still lacks complete solution.

National Lead Takes Over AEC Lab

National Lead Co. is to operate the Atomic Energy Commission raw materials development laboratory at Winchester, Mass., starting July 1.

Designer of the Winchester facility, where processes for treatment of uranium-bearing ores are developed, was American Cyanamid Co., which has been the operator since 1951.

Some months ago AEC sent out a call for proposals from companies believed to be interested in running the Winchester laboratory. National Lead, with long experience in handling metal-bearing ores, offered the bid most satisfactory to AEC.

SCRAP: Exchange Plan Marches On

Scrap men oppose Chicago Mercantile Exchange plan . . . But proponents carry plans forward without flinching . . . Two problems still lack solution—*By K. W. Bennett.*

Opposition to trading of scrap on the Chicago Mercantile Exchange appears to have been solid since the scrap industry began to explore the idea. At a May 5 meeting of Chicago's Institute of Scrap Iron & Steel a unanimous vote declared against scrap as an exchange listed item.

But without visible flinching, the Exchange appeared last week to be finalizing plans to carry No. 1 heavy melting and No. 2 heavy melting as scrap grades that would be bought and sold on the cash and futures exchange market at Chicago.

At mid-week, Everette B. Harris, president of the Exchange was to speak before the Pittsburgh chapter of ISIS and was to stand up to a question and answer period following his discussion of exchange merchandising practices.

Simplify Specifications

Back in Chicago, the week before, at least one dealer had purchased a seat on the Mercantile Exchange, apparently preparing to do business when the Exchange opened its scrap marketing Aug. 1. The Exchange indicated that two mills had indicated some unsolicited interest.

Coupled with this was a tentative announcement of specifications for the 40-gross-ton carload lots in which the two grades would be handled. "No. 1 Heavy Melting Steel. Clean wrought iron or carbon steel scrap ¼-in. and over in thickness, not over 18 in. in width and not over 5 ft in length. Individual pieces must be free from attachments and so cut as to lie flat in the charging box. New mashed pipe ends 4-in. and over may be included. All factors pertaining to grade in this definition shall be those customarily acceptable to the trade."

Set $5 Differential

This is a shortened version of the 1953 Scrap Institute Yearbook Specification for the grade. The Institute specification goes on to state that heavy forgings, forge butts, billet, bloom, slab or bar crop may be used in certain instances; that auto body and fender stock may not be used.

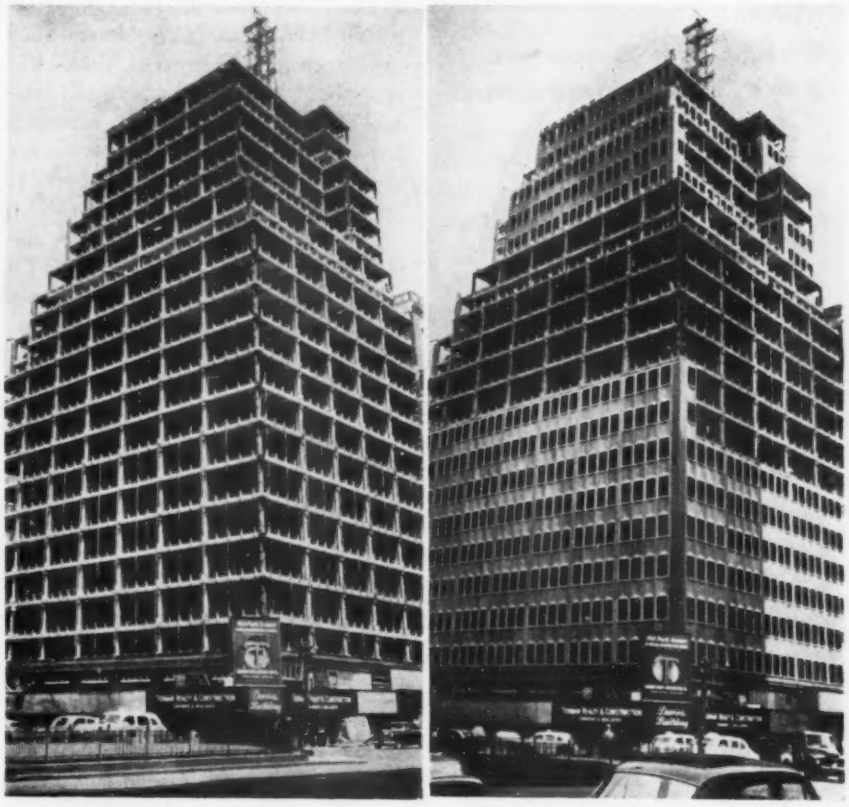
In what are called tentative rules for trading, the Rules Committee of the Mercantile Exchange has suggested that (1) minimum price fluctuations on futures call shall be 12.5¢ per ton or $5 per contract; (2) that No. 2 Heavy Melting Steel may be substituted for No. 1 Heavy at a discount of $5 per ton.

With the differential between No. 1 and No. 2 Heavy Melting usually running at about $2 per ton, this would seem to eliminate the possibility of making a substitution without a stiff penalty.

On the other hand, should the day ever come when No. 2 Heavy, like No. 2 dealer bundles would drop more than $5 below, the purchaser of No. 1 Heavy would be flooded with No. 2 scrap. Though this seems an outside chance, it's already happened in bundles.

Tentatively, the Rules Committee has set its commissions at $20 per contract for a non-member wishing to purchase or sell on the exchange, or $10 per contract (or per 40-ton car) for an Exchange member. It is assumed that if the Exchange begins trading on Aug. 1, then on that day futures will be marketed for December and March delivery. Delivery months have been tentatively announced as January, April, July and October, with each contract opening date 6 months or more prior

Before • • • and 5 Hours Later



Aluminum panels used on new skyscraper in New York were put in place in a single day. If masonry had been used it would have required 6 to 8 weeks. Pictures show progress made in 4 hours and 45 minutes by 61-man installation crew.

to its delivery date. Delivery would be to approved yards in the Chicago switching district.

The Exchange believes that "hedging," the trading of cash and future sales simultaneously to reduce loss in a down market, will justify trading of scrap as a listed commodity. As of last week, a firm opposition from many quarters of the Midwest scrap industry was continuing unbroken. But, like it or not, it appeared that scrap would be listed sometime in August.

If all goes according to plan, the Exchange must solve two knotty problems before Aug. 1. First, what margin will have to be put up by a buyer or a seller? And second, who's going to inspect scrap to insure that it meets the specifications that the Exchange, in effect, is guaranteeing when it allows a specific carload of scrap to be traded on the Exchange floor? At presstime, the questions were still without answers.

Steel:

Republic adds to delivered prices . . . Will extend system.

Republic Steel Corp. likes delivered prices. So the firm is extending this pricing system to cover small shapes, reinforcing bars, plates and structurals effective July 1 and will add hot-rolled and cold-finished alloy bars later in July.

Originally applied to hot-rolled carbon steel bars late last year (See THE IRON AGE, Dec. 3, 1953, p. 113) the delivered price method was recently extended to cover cold-finished carbon bars.

Three main advantages are cited by Norman W. Foy, Republic sales vice-president: (1) Customer's transportation problems are eased. (2) Salesmen can quote delivered prices quickly, and (3) Simplification of clerical work saves time and money in sales, traffic and accounting departments.

In the Republic system, a delivered base price is established for each county in the nation into which a product is normally shipped from each of the firm's plants.

Contracts:

Economic distress no reason for awarding defense jobs.

Defense contracts are not to be used to relieve economic distress, congressional conferees warn the Defense Dept. in approving a $28.8 billion defense appropriation.

Action Is Clear

House and Senate members, while concluding that it would be "confusing and impractical" to write a specific restriction into the bill because another law fixes standards for awarding defense contracts, nevertheless made it clear economic distress was not to be a determining factor in awarding contracts.

Prevent Political Pressure

The conference committee, whose action cleared the way for President Eisenhower's signature, killed a provision to require that defense contracts awarded on a competitive bidding basis go to low bidders. Sen. John J. Williams, R., Del., who protested, said the Navy awarded a contract to a shipyard whose bid was about $8 million above the lowest. He argued that when competitive bids are called for, low bidder should get the contract to prevent "political pressure."

The conference committee assigned the Army approximately $7.5 billion; Air Force $11 billion; Navy $10 billion, and $300 million for miscellaneous service-wide programs. The total was $61 million less than the Senate originally voted and $115 million more than the House approved. President Eisenhower had requested $29.8 billion.

"Not sure I can handle this job."

Plan More Defense Subcontracts

Small firms are to get more subcontracts from large prime contractors, under a new government policy of spreading defense jobs.

This is part of a plan for future action described by Small Business Administration Chief Wendall B. Barnes at a recent meeting with the agency's National Council of Consultants. Following moves were also discussed.

In coming months, SBA intends to emphasize the current production assistance program. This is designed to provide a clearing house for ideas on new products and on new uses of established products and to aid small firms in making full use of available laboratory space.

Production facilities inventories maintained by SBA field offices are being simplified as a preliminary step to expansion. Field office files now list facilities of about 20,000 firms as a basis for referring contract bid information.

Listing of data on another 80,000 or more small companies is planned.

Contracts Reported Last Week

Including description, quantity dollar values, contractor and address. Italics indicate small business representatives.

Repair parts for fuel oil purifiers, 3112, $134,925, The Sharples Corp., Philadelphia, Pa.

Repair parts for gasoline engines, 22720, $220,173, Johnson Motors Div., Waukegan, Ill.

Repair parts for diesel engines, 420760, $313,582, Detroit Diesel Eng. Div., Detroit, Mich. *J. E. McKenna.*

Forgings, alloy steel; ring, breech, 88, $563,200, The Midvale Co., Philadelphia, Pa.

Range, electric, 1201 ea, $92,645, Tennessee Stove Works, Chattanooga, Tenn.

Range, electric, 2702 ea, $223,914, Hotpoint Company, Chicago, Ill.

Trainer, flight simulator, 6, $2,648,201, Westinghouse Air Brake Co., Pittsburgh, Pa.

Propeller S/P, 238, $7,702,978, Allison Div., Dayton, Ohio.

Intervalometer, 1247, $472,750, Ryan Industries, Inc., Detroit, Mich.

Dynamotors, spare parts, $124,874, Elcor, Inc., Chicago, Ill.

Tank assy, 1644, $255,987, Pastushin Aviation Corp., Los Angeles, Calif.

Remote tuning assy, 724, $239,311, Central Commercial Industries, Inc., Chicago, Ill.

REPORT TO MANAGEMENT..

The ash trays were empty

Main concern of almost everyone last week was how to stop smoking. For many people abstention was a harrowingly nerve-wracking experience and they are now gradually returning to their pack-a-day or more schedule.

But the short-lived experiment had its effects. That small dip you'll notice in production figures covering the last week can be attributed to the short tempers, frustration and general irritability of smokers who tried to get themselves off the nicotine hook.

Sky's the limit

Much better reading than the findings of American Cancer Society researchers are reports on construction from F. W. Dodge Corp. In a year when almost everything else is going down, there seems no limit to how high the construction industry will build its business skyscraper.

Contract awards in May for future construction in the 37 eastern states (excluding atomic energy projects) were the highest for any month in the 63 years the Dodge Corp. has been keeping tabs.

May awards totaled $1.93 billion, 14 pct more than in April and 20 pct ahead of May '53. Even including AEC construction projects, the January through May period of this year set a new record for any first 5-month period, totaling $7.52 billion, 11 pct ahead of same period last year, 2 pct above the previous record set in 1951.

Watch "people handling"

It's still in the things to come department but it becomes increasingly apparent that conveyor belt "people-handling" will eventually be a very big industry.

One top transportation executive last week predicted that Americans may someday travel across the country on rolling roads --super conveyor belts powered by the energy of the sun.

He stated that, "Starting from primitive 30 mph strips, these rolling roads might mushroom into a complex network of strips of varying speeds up to 100 mph, each shielded by glass windbreaks and each lined with stores and theaters and restaurants."

What new industry means

You've undoubtedly noticed the number of industrial development organizations that are springing up all over the U. S. And perhaps if you're in a town where your firm provides the community's sole industry you may have been approached to take part in a program designed to bring in new firms.

Would it pay to push such a program? Chances are that it would and the benefits to your town and perhaps your firm would be tremendous.

Ten year survey of a nine county area by Chamber of Commerce of the U. S. showed that for every 100 new industrial workers brought in, retail sales were upped $360,000, personal income rose $590,000, and bank deposits climbed $270,000.

Addition of each 100 new industrial workers also meant 74 new jobs in other lines of work,112 more households, and a population increase of 296.

Industrial Briefs

Up, Up, Up . . . The Foxboro Co., Foxboro, Mass., is constructing a 15,000 sq ft plant at 2270 Noblestown Road, Pittsburgh.

Making Arrangements . . . Foundry Equipment Manufacturers Assn. has made arrangements to have its headquarters located at No. 1 Thomas Circle, Washington, D. C.

They'll Be There . . . North American Philips Co., Inc., Research & Control Instruments Div., Mt. Vernon, N. Y., will occupy booths 1122, 1124 and 1126 during the Instrument Society of America Convention at Convention Hall, Philadelphia, Sept. 13-24.

An-cor-lox *Lock Nuts*
all purpose LOCK NUTS
makes good equipment better

ALL METAL—Withstand vibration, shock, high temperatures, corrosive conditions.
SELF CONTAINED—No assembling of the lock nut before using.
LOCK TIGHTER—Conditions of vibration improve the locking-power. There is no need to replace An-cor-lox lock nuts after use.
STANDARD BOLTS—An-cor-lox lock nut dimensions conform to standards for plain nuts . . . threads conform to national form.
CONVENTIONAL WRENCHES—No special tools are required to apply An-cor-lox lock nuts.
SCREWS ON EASILY—Like an ordinary nut until it is locked in position.

AN-COR-LOX DIVISION
641 PINE STREET ELIZABETH, N. J.

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Data	AC Motors and	Mechanics of
Builder's Data	Generators	Engineering
Lumber Data	Trans. Relays &	Materials
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Chemical Tables	Machine Design	Charts
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Production Started . . . Central Foundry Co., Holt, Ala., has started production of fiber pipe in its new plant. First delivery of the new pipe, made of cellulose fiber and a preservative adhesive, has just been made.

New Mine . . . Big Creek Mining Co. will operate a new iron ore strip mine that is going into operation this week on Big Creek, near Spring Hill, Ala. The mine is expected to eventually produce about 200 tons of ore daily.

Expanding . . . Reynolds Metals Co. plans a $2,585,000 expansion and modernization program at its aluminum sheet mill facilities at Sheffield, Ala.

Named . . . Beryllium Corp., Reading, Pa., has named the Brass & Copper Supply Co., Inc., Baltimore, a distributor of Berylco beryllium copper strip and rod, to serve users in Maryland, Delaware and Virginia.

Expansion . . . Timken Roller Bearing Co. plans to install six new furnaces costing $360,000 and auxiliary equipment at its Bucyrus plant.

New Facilities . . . Canadian Car & Foundry Co., Ltd., has completed its $4 million modernization program at the Longue Points steel foundry in Montreal East.

Still Serving . . . National Acme Co. marked 50 years of continuous service at an informal meeting recently.

Celebrating . . . Clark Equipment Co. is celebrating its 50th anniversary and has put out a book covering the history of the company.

Memphis Warehouse . . . Laclede Steel Co. will open a new 36,000 sq ft warehouse and fabricating plant in Memphis this fall.

New Home . . . Leschen Wire Rope Div., H. K. Porter Co., Inc., has moved to a new general office at 2727 Hamilton Ave., St. Louis.

Full Swing . . . John A. Roebling's Sons Corp., Trenton, N. J., is now in full commercial production of tellurium alloy lead sheath cable.

Official Opening . . . Crucible Steel Co. has opened its new Buffalo branch sales office and warehouse building. Charles J. Glassman is manager.

Works Opened . . . Aluminum Co. of America officially opened its new Lancaster Works in Lancaster, Pa., recently. It is the company's first plant to be devoted exclusively to the production of fasteners and screw machine products.

Appointed . . . Adamas Carbide Corp., Kenilworth, N. J., has appointed Production Tooling Service, 411 N. Twenty-Third St., Birmingham, as its sales representative for Alabama and Tennessee.

Plays Host . . . Hooker Electrochemical Co. played host recently to a group of approximately 225 people visiting its newly-opened $12 million caustic soda and chlorine plant.

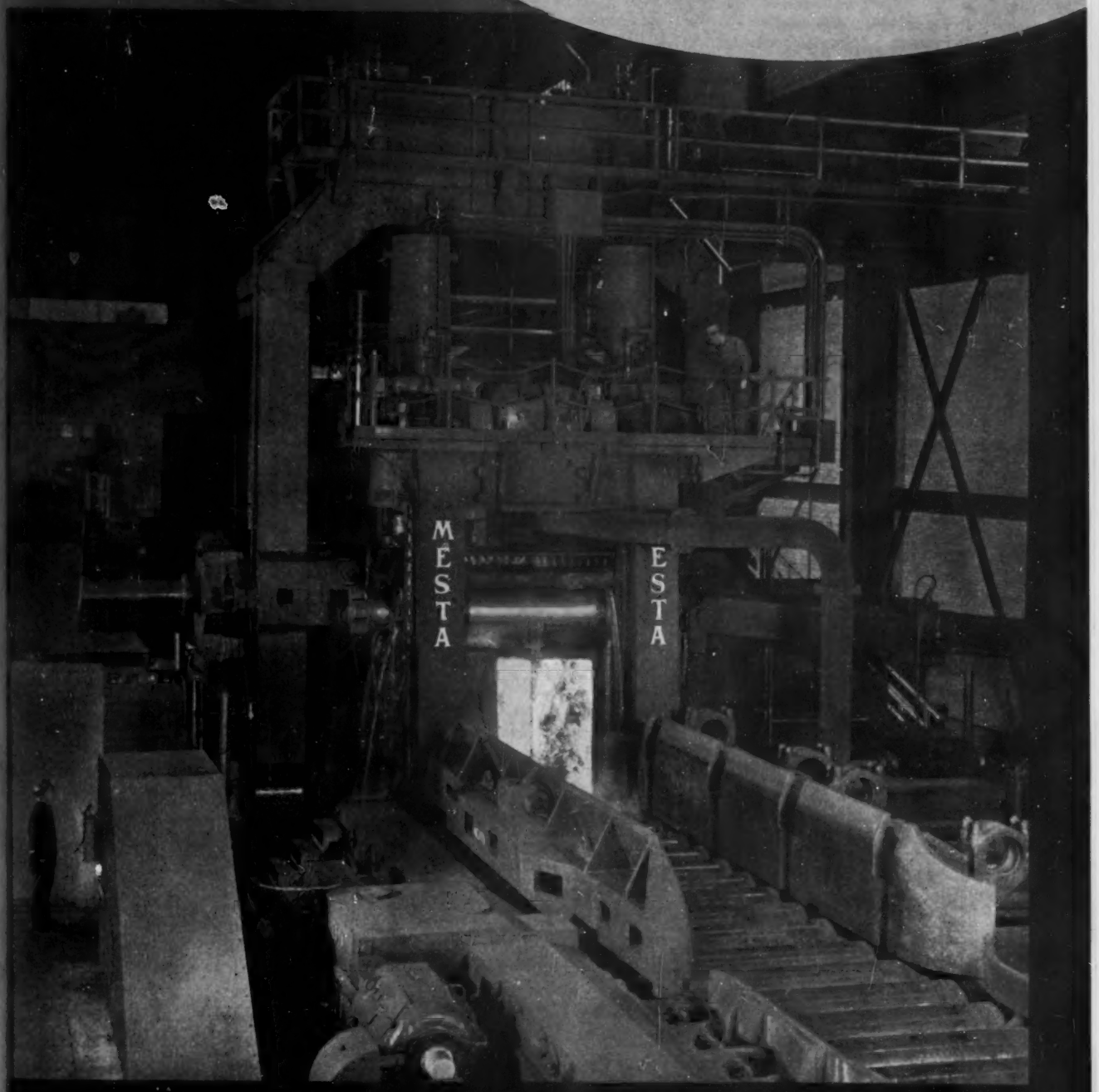
Gets Order . . . Baldwin-Lima-Hamilton Corp. has received an order for a 35-ton diesel hydraulic industrial locomotive from General American Transportation Co., Saegertown, Pa.

Safety Award . . . Union Carbide and Carbon Corp., New York, received an Award of Honor from the National Safety Council. The Award is made for reducing frequency and severity rates below par rates established by the Council.

Designed and Built by
MESTA

SLABBING MILL
for Great Lakes Steel Corporation
DIVISION OF
NATIONAL STEEL CORPORATION

Rolling 20 Ton ingots into slabs on a Mesta 35"x 90" Universal Reversing Slabbing Mill



DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

MESTA MACHINE COMPANY • Pittsburgh, Pa.

Packard-Studebaker Make Strong Unit

Oldest, last independents merge . . . Both have excellent management, good products . . . Dealers can have joint franchises, cover most of market—*By R. D. Raddant.*

Within the last 18 months the face of the automotive industry has undergone the most significant plastic surgery than in any similar period since the days of the first horseless carriage.

Formation of the new Studebaker-Packard Corp. (subject to stockholder approval) brought the number of operating companies down to six where nine flourished less than two years ago. (THE IRON AGE, May 27, 1954, p. 90). And the significant thing is that these occurred within a year after the much heralded "return of competition."

What's more, there is little doubt that more surgery is in the wind for the future, but probably not until the present combinations have an opportunity to get used to their own appearance.

Auspices Favorable . . . On the face of it, the Studebaker-Packard Corp. appears to have the best assurance of success. The two consolidating companies are well-managed organizations with excellent products and records behind them. If there are further combinations ahead, it is safe to speculate that the newest company will be the dominant figure in negotiations.

But what will the latest merger do for the new company?

Actually, any benefits from joint manufacture of component parts, development of a central styling or engineering organizations or similar measures are at least a year off. Both firms' 1955 cars are tooled up and it is unlikely that any manufacturing operations will be shifted immediately.

James Nance, Packard president who will take over as president of the new organization, pointed out that the benefits of joint marketing will be more immediate than the benefits of integrated operation.

This means that combined dealerships, many of which will handle both lines as well as Studebaker trucks, are expected to improve the new company's marketing position substantially. Studebaker has about 2500 dealers, Packard 1200, but the new company is shooting for 4000. Dealers who will handle both makes will be designated by a "highly selective" process.

Many questions were left unanswered in the official announcement, particularly on definite plans for taking advantage of combined facilities.

HEADS TOGETHER are Harold S. Vance, James J. Nance and Paul G. Hoffman, chiefs of Studebaker-Packard Corp.

For example, Mr. Nance said: "We want economies but at no time do we contemplate jeopardizing the virility of the company." This statement seemed somewhat vague as to its real meaning.

Integration . . . If it means no real try will be made to integrate the two lines of cars through common parts and integrated operations, the benefits of consolidation can very easily be bypassed.

For example, there are only three basic bodies for 5 General Motors lines. Ford and Chrysler follow the same system of basic bodies with one body frequently serving 2 different cars. Through fender, hood and other modifications, many styling variations can be made without losing the economies of major part interchangeability.

Unless Studebaker-Packard or any other merged company goes in for such basic economies in manufacturing as well as centralized engineering and styling, some central purchasing and other joint functions, the advantages of the corporate union can evaporate into thin air.

See Executive Action . . . However the 3 heads of the company, Paul G. Hoffman, as chairman, Mr. Nance as president, and Harold S. Vance, Studebaker's president, as chairman of the executive committee, know the facts of life as well as any executives in the industry. Their records would indicate that the necessary actions will probably be taken.

In fact, some of the pointed insistence on separate identity was obviously for morale purposes and public benefit. However, there appears to be no compromise with the fact that Packards will be built in Detroit and Studebakers in South Bend, but this can be done without losing the benefits of divisional over independent operations.

Might Switch Transmissions . . . Of immediate benefit could be Studebaker's use of Packard's Ultramatic transmission, replacing the Borg-Warner transmission now installed on Studebaker cars.

On the financial side, Packard's outstanding shares will be split in reverse with each stockholder receiving one share for five. Packard will then acquire the assets of Studebaker to form the new company with each Studebaker share-

holder receiving 1½ shares of the new corporation's stock for each share of Studebaker stock he now holds.

Studebaker-Packard will have combined assets of $253 million with a working capital of $87 million. The new management team has no immediate plans for further financing.

Replacement:

GSA could save millions in auto trade-ins.

U. S. government seems to lag far behind industry in economy of maintaining and operating the Federal fleet of cars and trucks.

It lags about $39 million per year behind reduced costs possible if the fleet were modernized. Immediate saving of $19.4 million a year could be attained if a 6-year modernization program were adopted.

This is disclosed in a proposal made by the General Services Administration. Recommendations following a lengthy study concluded that commercial methods could show vast economies if applied to the Federal fleet.

As of June 30, 1953, the agencies and departments of the Federal Government reported ownership and operation of 260,794 commercial type motor vehicles, excluding those used for tactical or troop-training purposes.

Because of special equipment or other factors, only about 195,000 vehicles could be brought under the GSA plan.

Cars Kept Too Long

Principal factor blocking improved economy is the existing replacement policy which "generally results in continuing vehicles in service until they are more than 6 years old and far beyond the point of economical repair."

GSA report contends that the adoption of a 3-year replacement cycle would reduce depreciation to $29.3 million, saving $14.6 million a year.

By June 30, 1954, 30 pct of the fleet was 6 or more years old. Replacing vehicles on a 3-year cycle would cut annual maintenance bills $23.4 million and operating costs $1.9 million.

Seek 3-Year Cycle

To reach this stage, where a 3-year cycle is in operation, a 6-year transition is recommended. This would require purchasing 390,000 cars in 6 years instead of 195,000 under the old plan.

This would require a capital investment of $35.4 million, but would be more than offset during the 6 years by the savings of $152 million in maintenance and operating costs. In addition market value of the fleet would be increased by more than $107 million.

Net savings, not including the increased value, would be $117 million or $19.4 million per year. After modernization, annual savings would reach $39 million.

Ford Plans Modernization

Ford Motor Co. which still has about $500 million left in its current expansion program, may also be planning another long-range modernization and improvement program. Benson Ford, Lincoln-Mercury general manager, said that a final decision may be dependent upon "factors which are not purely economic."

Meanwhile, three new buildings and an addition to a fourth, totalling nearly 1 million sq ft, will be constructed at the Ford Research and Engineering Center in Dearborn. Buildings will include a body engineering building, a scientific laboratory and research building, a new cafeteria, and an addition of a new wing for the engineering staff administration building. Another new Ford building announced recently is a manufacturing development facilities building for research on methods.

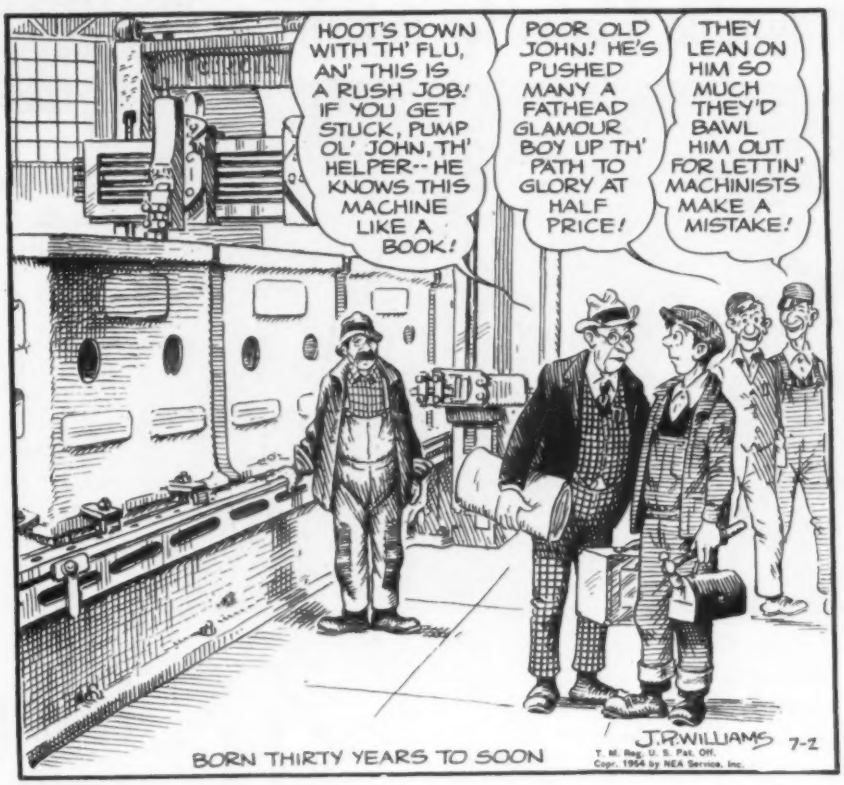
Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
June 26, 1954..	120,162*	21,551*
June 19, 1954..	118,663	21,400
June 27, 1953..	152,917	20,785
June 20, 1953..	149,601	20,756

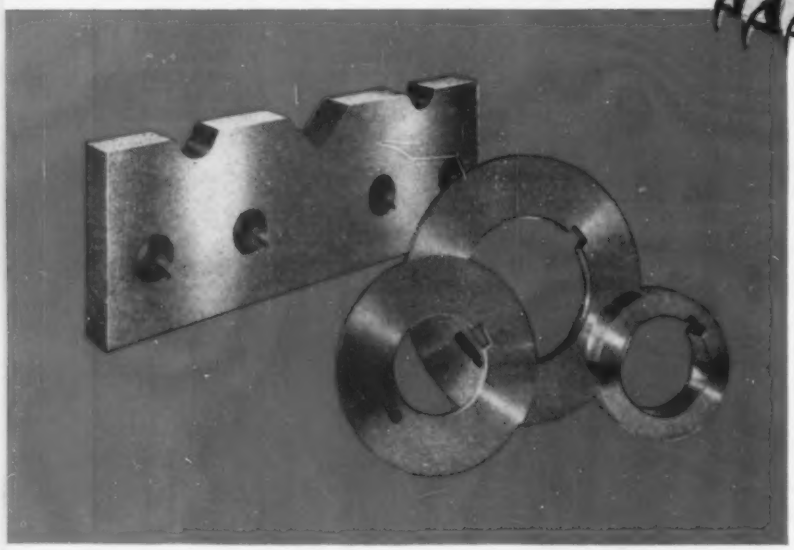
*Estimated. Source: *Ward's Reports*

THE BULL OF THE WOODS By J. R. Williams


HOOT'S DOWN WITH TH' FLU, AN' THIS IS A RUSH JOB! IF YOU GET STUCK, PUMP OL' JOHN, TH' HELPER-- HE KNOWS THIS MACHINE LIKE A BOOK!
POOR OLD JOHN! HE'S PUSHED MANY A FATHEAD GLAMOUR BOY UP TH' PATH TO GLORY AT HALF PRICE!
THEY LEAN ON HIM SO MUCH THEY'D BAWL HIM OUT FOR LETTIN' MACHINISTS MAKE A MISTAKE!
BORN THIRTY YEARS TO SOON
J.R.WILLIAMS 7-2
T. M. Reg. U. S. Pat. Off.
Copr. 1954 by NEA Service, Inc.

built for **rugged action**

Heppenstall SHEAR KNIVES
durable blades for industry



Many leading plants make Heppenstall their standard specification for shear knives. Heppenstall's record for durability provides such production advantages as:

- **MORE CUTS BETWEEN GRINDS**
- **MORE UNITS PER BLADE**
- **LOWER OVERALL BLADE COST**
- **INCREASES IN PRODUCTION**

The reasons may be found in Heppenstall's high standards for the development and manufacture of shear knives. Made from high quality, electric induction steels, these long-lasting knives are famous wherever hot and cold ferrous and non-ferrous metals are cut and sheared.

Make Heppenstall *your* standard specifications.

Heppenstall

The most dependable name in forgings

PITTSBURGH 1, PENNSYLVANIA

Sales offices in principal cities

Delivered Price Battle Shaping Up

Kefauver group would overthrow court decision okaying "good faith" competitive pricing . . . White House backs other view . . . Need speedy action—By G. H. Baker.

The Senate is heading into a new battle over delivered-price legislation. Ruckus now in the making involves two competing views on industrial pricing.

Forces led by Sen. Kefauver, D., Tenn. (a longtime foe of delivered pricing), want to eliminate as an acceptable judicial argument the defense that competition in certain heavy industries like steel requires the "good faith" meeting of competitors' prices.

Ike Backs Other View . . . Sen. Capehart, R., Ind., leads an opposing move to write into law the right of any seller, acting independently, to sell at delivered prices, or to absorb freight to meet in good faith the prices quoted by his competition. The Capehart bill (S. 3646) is backed by the White House.

Effect of the Kefauver plan is to overthrow a Supreme Court decision (Standard Oil of Indiana case) holding that a company may in good faith and to meet competition align his prices with those of competitors.

Scramble for customers among producers of steel, cement, and chemicals and the resulting concessions being made by sales departments all point to the need for fast action by Congress.

More "Nike" Defense . . . More U. S. cities are to be put under "Nike" umbrellas in the months ahead. At the present time, guided-missile apparatus is being installed in rings around a dozen key U. S. cities. Ten of the areas have been identified: Boston, New York, Philadelphia, Washington, Norfolk, Pittsburgh, Detroit, Chicago, Los Angeles and Seattle.

Army now wants Congress to vote a special fund of $85 million for "an additional increment" of missile installations. It declines on grounds of security to name the additional cities it has in mind for inclusion in the "Nike" picture. "Nike" is capable of supersonic speeds and exhaustive tests in recent months show that it has a high degree of effectiveness in tracking down enemy aircraft that come within its range.

Extend Trade Act . . . The Eisenhower Administration will not be able to make any more major tariff reductions in the next 12 months as a result of the one-year extension of the reciprocal trade act proposed by Congress. Virtually all of the tariff-cutting powers in the extended act have been used since it was first enacted in 1945.

An eleventh-hour attempt by a bloc of Senate Democrats to force enactment of a liberalized 3-year trade-tariff law, requested earlier by President Eisenhower, was defeated by 13 votes as the lawmakers lined up along party lines.

Not Enough Time . . . The President recently acquiesced to a one-year trade bill, but made it clear that next year he would press for a longer act permitting him to reduce selected import duties as much as 15 pct over a 3-year span. He said the lawmakers had not had sufficient time to study the proposal.

Backers of the liberalized bill, including the Administration in earlier statements, claim more liberal trade policies are desperately needed to prevent the Communist-bloc countries from expanding their economic sphere of influence and wooing away some of our wavering allies.

A minor amendment to the version passed earlier by the House requires the President, before lowering a duty, to consider whether the action would threaten domestic production of an article important to national defense.

Ask Stockpile Funds . . . Anticipated availability of certain strategic and critical materials and a new plan for increasing stockpile objectives to reduce this country's dependence on foreign sources has led President Eisenhower to seek an additional $380 million to build up the national stockpile.

The money would go to the General Services Administration for the fiscal year beginning July 1 and remain available until used.

President Eisenhower did not ask for additional stockpile money in his budget. But he indicated that $585 million in previously-appropriated funds would be spent next year.

Plan Is Separate . . . Which materials are expected to become available in greater quantities was not disclosed nor were details of the new stockpile objectives developed by the special Cabinet Committee on Minerals Policy.

Office of Defense Mobilization, however, made it clear the funds are not to be used in connection with the new long-term stockpile, details of which are still being worked out. This program will re-

Will Issue Disaster Manual

Publication of the government's new manual of disaster advice to the metalworking industries now is scheduled for around Aug. 1. The 8-man industry committee that authored the report for the Business and Defense Services Administration has turned it over to BDSA Iron and Steel Div. for final editing. Manual will be of inestimable value to every level of management in planning for plant operation under emergency conditions.

yesterday

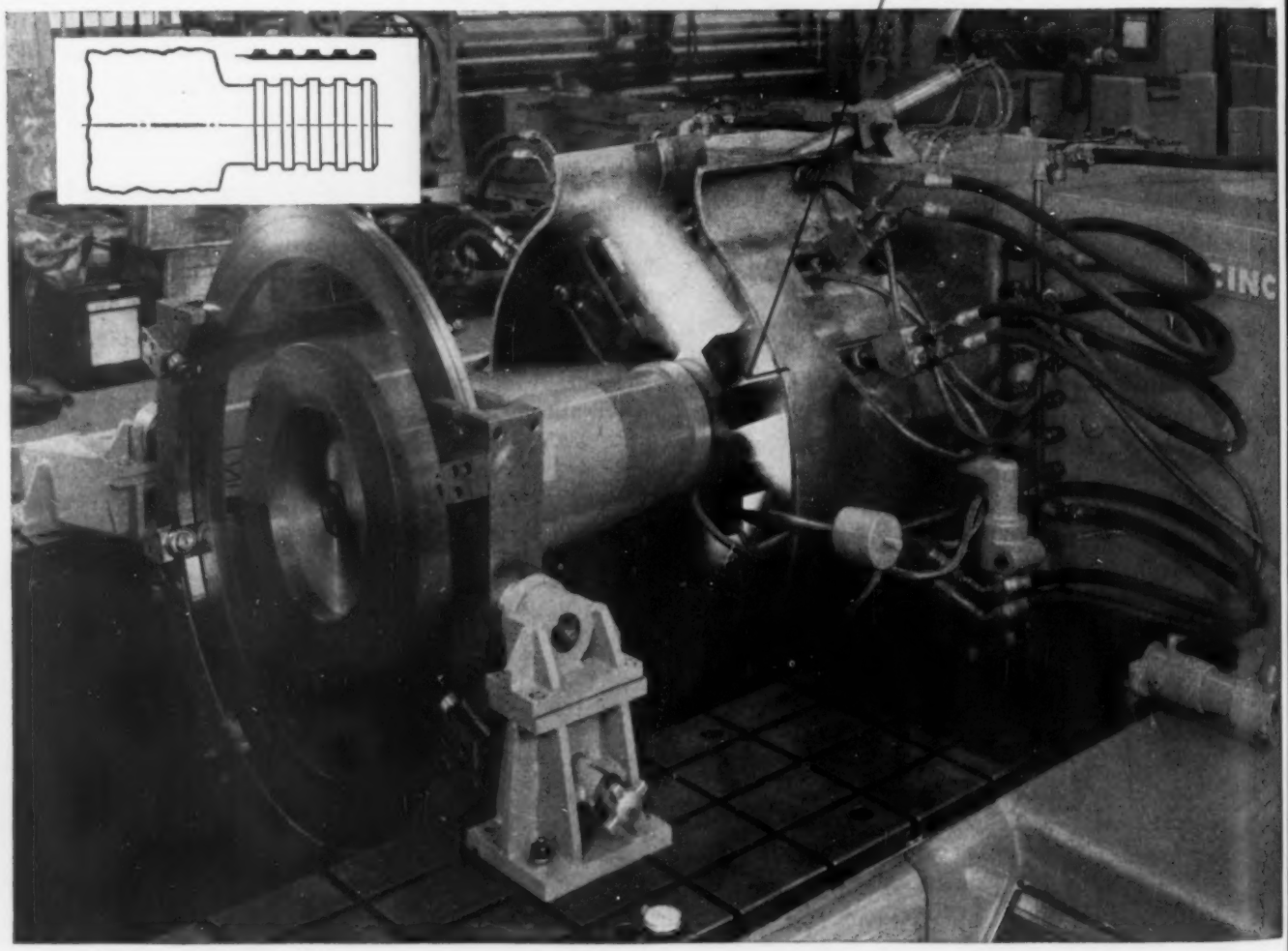
It's a far cry from the working model of the early Cincinnati Flamatic hardening machine shown at left to the "do-the-impossible" machines being run off today in the Flamatic Heat Engineering Laboratory. While the early machine hardened small gears in actual production and (among other things) helped to break a critical bottleneck in production of automatic 90 mm. gun loaders . . .

today

. . . one of Cincinnati's latest Flamatics (below) is hardening ball retention raceways in the assemblies for mounting propeller blades to go on aircraft we can't talk about. Races must be surface hardened to rigid specifications, before bearings are installed in the large assemblies. The work holding fixture by itself is quite a masterpiece. While Flamatics are getting bigger and more versatile, the original principles still apply: concentrate heat, control temperatures and confine hardness.

what's new

in flamatic selective surface hardening



Flamatic's new modern heat engineering lab can handle your heat treat problems from development right through to production. Write for Catalog M-1724.

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THE CINCINNATI MILLING MACHINE

Cincinnati 9, Ohio, U.S.A. •

quire more than $2 billion during the next 5 years.

May Get Tough on EDC . . . Further shipments of U. S. military equipment in France and Italy may be held up until those countries decide whether or not they will ratify the European Army project (EDC). There is mounting congressional sentiment for imposing such a ban on shipments unless the governments of these two nations stiffen their resistance to Communism.

House Foreign Affairs Committee, for example, wants President Eisenhower to continue aid to West Germany, Belgium, Luxembourg and the Netherlands—countries which have already approved EDC—if he decides they're developing a collective defense program of their own.

The two countries which have not signed and ratified EDC can receive only shipments of military equipment remaining to be delivered out of appropriations for fiscal 1953 and earlier—a substantial amount according to the committee.

New Agency Does RFC Chores

Control of the government's 27 synthetic rubber plants and the Texas City tin smelter will be the job of the newest federal enterprise, the Federal Facilities Corp.

Organized by Treasury Secretary George Humphrey, FFC takes over production administration functions formerly handled by Reconstruction Finance Corp., which was required to be liquidated by June 30.

New agency will have responsibility for the rubber plants while their sale to private buyers is being arranged.

Report On Titanium Machinability

Seven new government reports on titanium detail research on life of high-speed steel tools in turning and shaping operations.

Reports are the first in a series describing research by the University of Michigan for the Army Ordnance Corps into the machinability of commercially-pure titanium and three titanium-base alloys—Ti 75A, RC 130B, and Ti 150A. Other metals were tested for comparison purposes.

Tungsten:

U. S. producers seek continued stockpile assistance.

Inclusion of tungsten in the long-range stockpile program is the only method of insuring an adequate domestic supply in an all-out war, say domestic tungsten producers.

Tungsten is scheduled to be stockpiled through 1958 or until some 3 million short ton units are accumulated.

Industry argues that cheap labor and U. S. aid helped foreign producers send 28.7 million lb to this country last year at a price which domestic producers cannot meet.

Unless the Federal Government continues to pay $63 a unit—admittedly a high price—for domestic stockpile tungsten, the industry says it will not be able to continue producing and developing new deposits. At present, the government buys the entire domestic output.

As a result of the stockpile program, according to James A. White, of the Tungsten Institute, domestic production of 9 million lb exceeded domestic consumption in 1953 for the first time.

Present domestic production will not meet the country's military needs in time of an all-out war, Mr. White says. Industry is confident that domestic deposits can be developed which would make the U. S. self-sufficient if the government continues its stockpile aid, he adds.

Arthur Flemming, director of Office of Defense Mobilization, believes the tungsten stockpile is in good shape for the time being. Whether he will go along with industry contention that continued government purchasing is necessary will not be known until the new program is announced this summer.

"Do you want to wait for our bill, or do you like the false security of a rough estimate."

NLRB OK's Pre-Election Wage Hike

An employer who grants a wage hike just prior to a union election is not violating National Labor Relations Act nor invalidating the election if the union had openly challenged the company to grant the raise, the NLRB rules.

NLRB found in the case of an American Federation of Labor machinists' complaint against the Gong Bell Manufacturing Co., East Hampton, Conn., that promises or grants of benefits usually constitute interference by the employer because they are "calculated to beguile employees into rejection of the union seeking their votes." But the union's challenging of the company to grant the hike discredits any claims of beguilement in this case, NLRB found.

Meanwhile, the U. S. Dept. of Labor's contention that employees, although partially engaged in interstate commerce, are entitled to the minimum wage for interstate industries for the full week, was upheld by a Federal Court of Appeals at New Orleans.

Ike Picks Castle as Seaway Boss

Lewis G. Castle, Duluth, Minn., banker, has been named by President Eisenhower to be administrator of the St. Lawrence Seaway Development Corp. The job pays $17,500 annually. As boss of the SLSC, Mr. Castle will be responsible for supervising all construction of the U. S. portion of the seaway.

A 64-year-old Republican and a native of Portage, Wis., Mr. Castle has been president of the Northern Minnesota National Bank of Duluth since 1946.

A STUDY of ALUMINUM SHEET ANNEALING

Fabricators of aluminum sheet products that require severe forming or deep drawing are familiar with the drawbacks of using material with irregular grain structure and/or a heterogeneous hardness pattern. Excessive grain size appears in the form of "orange peel" effect, and when directional properties are not closely controlled, "earing" is apt to occur.

The "orange peel" detracts from the product finish and requires costly secondary operations to remove, and above normal "earing" means excessive scrap with frequently an extra trimming operation.

Photograph illustrates seven types and shapes of drawn aluminum alloy cups exhibiting varying degrees of ears.

SCOVILL MANUFACTURING CO. LEADS THE WAY

Two years ago the Scovill Manufacturing Co., Waterbury, Conn., a producer of aluminum sheet since 1889, in anticipation of future requirements of industry, set into operation an aluminum annealing system that was the result of years of planning and experimentation. They wanted to provide a sheet with exceptional uniformity of physical properties and grain structure with an especially fine finish. And, they wanted to offer this strip in extra-long coils.

Scovill studied all existing methods of annealing and selected the Lee Wilson Bell Type Radiant Fired "O" Tube Furnace with Controlled Nitrogen Atmosphere as the equipment best suited to do the job.

Photograph illustrates varying degrees of "orange peel" effect.

In 1952 the installation was completed. It comprises two furnaces and six bases. Each furnace is equipped with 12 Lee Wilson "O" tubes with a total input of 3,600,000 BTU per hour at maximum fire rate. To get the most effective heat transfer possible, Lee Wilson convector plates are placed between stacked coils of the charge.

WILSON FURNACES ARE FAST

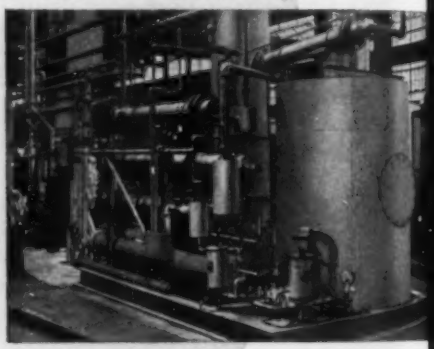
A study of coil size requirements resulted in a base which can load three stacks of 36" diameter coils with a piling height of approximately 60" net per load. In determining piling height, deformation and sticking of bottom coil edges were considered. Large coil requirements were considered in designing furnace diameters. With full charges of coils large enough to utilize convector plates, production per furnace with three bases is about 2500 lbs. per hour, or 5000 lbs. per hour for the installation.

NITROGEN ATMOSPHERE USED

For the first time in the history of aluminum annealing, nitrogen atmosphere is used. By keeping oxygen away from the aluminum during the annealing cycle, the formation of surface oxides is eliminated. The natural aluminum finish is retained.

What have Scovill and its customers to say about this controlled annealing? "We are getting," say Scovill officials, "sheet with controlled grain sizes, tempers, directional properties and dimensions far closer than once was thought possible. The control we can exert over the charge with the bell type furnace and regulated high input firing tubes in an oxygen-free atmosphere enables us to produce sheet of exacting grain structure and hardness with perfect uniformity throughout the entire charge."

Scovill has received glowing commendations from its customers which substantiate the above statement. Scovill calls this "new" aluminum sheet Truspec.



Generator which produces dry nitrogen atmosphere for the annealing process. A product of Gas Atmospheres, Inc., a Lee Wilson enterprise.

GET THE COMPLETE STORY

If you are in the business of producing aluminum or any non-ferrous or ferrous metal in strip, sheet, coil or wire and rod forms, check first with a Lee Wilson engineer before you buy annealing equipment.

Typical full charge of 36" diameter aluminum coils with convector plates in place.

Comprehensive view of the Scovill annealing installation of Lee Wilson bell type furnaces of the high convection type.

Lee Wilson Engineering Company • Inc.

20005 West Lake Road • Cleveland 16, Ohio

Busy Drillers Push West's Tube Output

Mushrooming oil-well business puts heavy load on West's only seamless tube mill . . . Start $160 million New Mexico-Pacific Northwest pipeline in 90 days—By *T. M. Rohan.*

The Colorado Fuel & Iron Corp.'s $30 million seamless tube mill at Pueblo is gushing pipe as fast as surrounding wells are gushing oil.

The new mill, only one west of the Mississippi and located in the heart of the mid-continent fields, has now hit 20 turns a week, is running 14 out of 15 openhearths and has customers' trucks waiting in line to rush the pipe off to the wells.

Jay Martin, operations vice-president, told THE IRON AGE last week, "The drillers are taking everything we can give them. They've got their own trucks lined up here waiting for the stuff. We're going to get almost 13,000 tons this month compared to 11,777 in May and the previous high of 8068 in March."

Steelmen, of course, are never completely happy and likewise Mr. Martin. "If only the rail business would pick up a little," he said, "we could go over the 100 pct mark."

Ask Truck Shipments . . . The rush for pipe to keep drillers busy is shown in 80 pct of orders being specified for direct truck shipment at premium. Since most drilling is done in remote areas, trucks can run the pipe in direct for faster delivery.

Production records are being set despite introduction of new sizes on the mill. Current output is in 2⅜ to 7½ in. size with heaviest tonnage concentrated on popular 5½ in. This week the mill starts production of 8⅝ in. size, never handled before, and in about a month will tackle 9⅞ in.

To inspire the steelworkers to their first 15,000 ton month, the firm has giant charts along three sides of the tube mill featuring pictures of an old mule-skinner racing toward the 15,000 ton goal. Pretty girls also distribute pioneer pins.

Wire and rod business has also improved in the last month for CF&I. Rod mill output is going about 24,000 tons per month and both agricultural and industrial wire is moving well in the area. Rail demand is relatively light, however, with major roads holding off ordering until carloadings pick up.

Strike hedge buying has been almost non-existent, according to officials of the firm.

Start Northwest Pipeline . . . Eyes of the two western pipe producers were on Texas last week. C. R. Williams, president of Pacific Northwest Pipeline Co., said in Houston that construction was to start in 90 days on a $160 million large diameter pipeline from New Mexico and Colorado to Oregon and Washington. Federal Power Commission approval was received early last week and followed years of wrangling over the project.

Engineering contract for the project has been awarded to Ray Fish Construction Co. of Houston, which built the line from Texas to New York in 1948-49. This was one of the first major pipelines on which Kaiser Steel furnished plate. Fabrication was done by Consolidated Western Div., U. S. Steel.

The new Pacific Northwest line will consume about 150,000 tons and construction is expected to start after completion of financing and engineering.

Another major western pipeline still under consideration is the Trans-Canada line which would run from Alberta to Toronto and Ottawa and require about 500,000 tons of pipe.

EARTHQUAKE-PROOF skyscraper is started in San Francisco's financial district by U. S. Steel Corp.'s Western Div.

Warehouse Cuts Stainless . . . Northern California warehouse business in stainless steel has grown to the point where cutting equipment is being installed.

A. M. Castle warehouse in San Francisco has completed installation of an Air Reduction Sales Co. special flame cutter for 18-8 stainless from 3/16 to ¾ in. The Castle unit is the only one located in a warehouse in Northern California, although others are in shops at Bethlehem-Pacific Shipbuilding Div. and naval shipyards at San Francisco and also at Vallejo, Calif.

Others are common in Los Angeles for specialized service to the aircraft industry, a heavy stainless user. Previously, Northern California outlets handled orders for special cut stainless from Los Angeles branches and absorbed freight or channeled to local specialists on small orders for cut stainless.

Principal Northern California markets are dishwasher and food machinery manufacturers, ship chandlers, and hotel, restaurant, and hospital supply houses.

. . . *but*
Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate — without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!

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Two Approaches to Automation

Mention of automation usually brings argument . . . Nobody's against it, just can't agree on best way . . . Cost vs. space is rotary-straight line battle—*By E. J. Egan, Jr.*

Mention the word "automation" to anyone concerned with machining operations and you're in for an argument. He has his ideas—you have yours.

Automation is complex and subject to many interpretations and misinterpretations. But its avowed goal of more production with better quality at less cost is one discussion area where there is almost complete agreement.

Not Established . . . Theoretically the automation concept could begin at the mine or mill, end up in a complete assembly of just about anything that will serve some useful purpose. And theory and practice do work out to a surprising degree in some fields, a modern dairy, carbonated beverage or canning plant, for example. But automation for precision machining in tremendous volume is not as yet so well established.

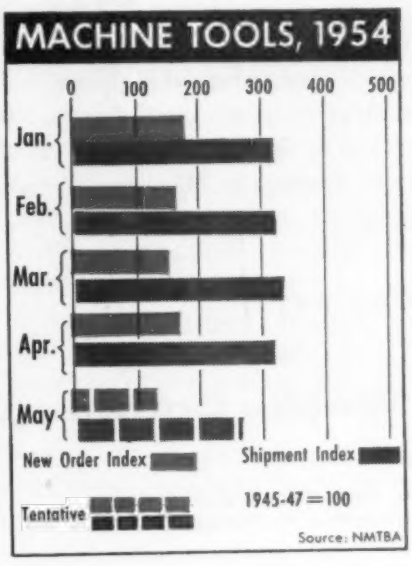
Detroit is an excellent place to study machine tool automation trends. Machining experts in the automotive industry have a big stake in automated lines—amounting to millions of dollar's worth. Just as engines, styling and other car features differ among the various makes, so do the views of automation experts on the best way to do necessary machining jobs.

Have Two Systems . . . Two basic systems seem to be vying for top position in the low cost-efficiency race. One involves the use of rotary indexing machines in which parts or tools are indexed, station by station, through a sequence of operations. Automatic feed and discharge mechanisms convey parts to and from these machines. The other system involves the use of single purpose machining units, also with built-in part transfer devices, but spaced out in a straight line manner.

What They Say . . . Backers of rotary indexing machines for top automation honors claim greater compactness and productive capacity per sq ft of floor area occupied. Rapid indexing and sturdy design for modern tooling techniques are pointed out as being important to fast, accurate machining.

Advocates of the in-line transfer machines might possibly concede the floor area battle to rotary indexing equipment. But they counter this and other arguments with claims of lower operating costs, less manual labor, greater flexibility and productivity.

Straight-line transfer enthusiasts maintain their single-purpose machining units are easier to integrate with changing production requirements or part specifications. If a new or revised machining operation is called for, the straight automated line is simply broken and spread apart at the proper point to install the needed unit.



Downtime Hurts . . . Wherever automation of either basic type is in use, the item of downtime for tool change or machine repair is extremely important. It's expensive trouble if everything must stop because of a shutdown at one tooling station.

Here again, supporters of in-line transfer machines claim an advantage. Parts approaching an out-of-order machining station are sometimes diverted to an alternate production line. In many cases the solution is to maintain a stockpile of work adjacent to each transfer unit. These reserve parts can be machined by independent unit control until the line is again ready for automatic operation.

While the arguments go on, automation itself will continue to benefit from improvements in both the rotary and straight-line methods.

Orders Still Sliding . . . U. S. machine tool shipments and new orders dropped to new post-Korean lows during May, according to preliminary estimates made by the National Machine Tool Builders' Assn. Total new orders dipped to an estimated figure of 139.9 on the industry's statistical index, compared with a final mark of 142.8 for April. In May, 1953, the new order index was 246.4.

Shipments of machine tools by domestic builders fell off by a marked degree in May, hitting an estimated index of 268.6. This is 34 points under the final April shipment figure of 302.7, and far below the May, 1953 mark of 356.0.

New orders to U. S. builders in the first 5 months of this year amount to about $232 million. This rate of incoming business is considerably below industry predictions in January.

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Countless numbers of commercial and industrial buildings, built during the past 40-odd years in almost every section of the country, are proof that Ingalls can meet your fabricated steel requirements, regardless of size or location. Plants at Verona (Pittsburgh district), Pa., Birmingham, North Birmingham, Pascagoula, Miss., and Decatur, Ala., assure *you* prompt, efficient and economical service.

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The Iron Age

SALUTES

Willard F. Rockwell, Jr.

Energy plus experience in many fields enabled him to take over top echelon jobs at an early age.

YOU don't have to tell Al Rockwell about hard sell. President of Rockwell Manufacturing Co. since 1947, he decided early in '53 that the days of the sellers' market were ending. Result: A thorough overhaul of the company's manufacturing and selling techniques, plus a plant consolidation which added 40,000 sq ft of manufacturing space.

After graduating from Penn State in '35, he was employed by Pittsburgh Equitable Meter Co. (one of the firms later merged to form Rockwell Manufacturing). A year later he joined Timken-Detroit Axle Co., returned in '38 to Pittsburgh Equitable Meter. The following year he was named vice-president and controller, positions he held until his army enlistment in '43. He came out a captain.

A vice-president of the Gas Appliance Manufacturers Assn., a trustee of the Council for Technological Advancement in Machinery & Allied Products Institute, Al is also a member of American Gas Assn., American Petroleum Institute, American Water Works Assn.

And he's a director of the Pittsburgh Chamber of Commerce, a trustee of two educational institutions and a hospital as well as a leading participant in fund-raising campaigns for fights against tuberculosis and arthritis and rheumatism.

When he gets time, Al goes in for hunting, fishing and woodworking—with Delta power tools, Rockwell products, naturally. And he gets extra practice in management by being head of a household that includes one wife, four sons, one daughter.

CINCINNATI 19" HYDROFORM
Five additional Hydroform machines of 8", 12", 23", 26" and 32" capacities are available.

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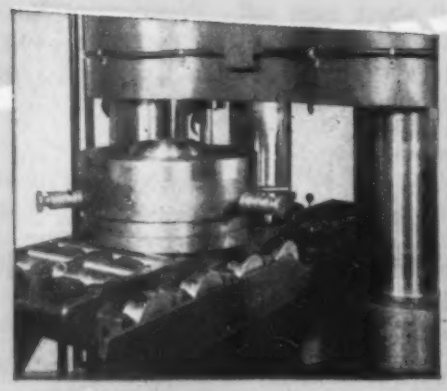
further simplified

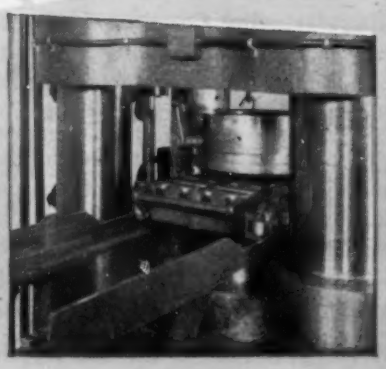
ON THE LARGER CINCINNATI HYDROFORMS

Now supplied with Cincinnati Hydroforms of 19", 23", 26" and 32" capacities is an integral tool conveying and handling system which facilitates the installation and removal of the tooling. The photographs below illustrate the tool handling method which eliminates any manual lifting of the components.

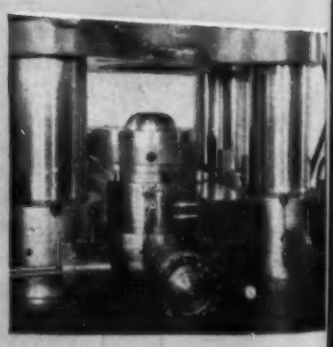
Design refinements such as this continue to simplify Hydroforming—which in itself has reduced the deep drawing process to its simplest form. Investigate the many Hydroforming advantages—for your part development work—or for short run production. Let a Cincinnati Milling field engineer give you complete details. For general Hydroform data and specifications of the six machine sizes, write for your copy of Bulletin M-1759-3.



a **Roller conveyor for moving Hydroform tools**—punch, draw ring and draw ring support—into position. Punch is seated on pins inserted through holes in draw ring support. Three lifting rods are inserted into draw ring support.



b **Roller conveyor with tooling** beneath the Hydroform dome. By lowering dome, connecting "S" hooks and then raising dome, tooling is lifted. (In this view, punch has been removed to show two of the "S" hooks holding tooling.)



c **Tooling in final position.** Lowering dome seats tools on bolster plate. Lifting rods are removed. Connecting punch to the ram completes the set-up. Tools are self-centering. In this manner, tools can be changed in 10 minutes.

CINCINNATI Hydroform

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

The Iron Age

INTRODUCES

Robert L. Fielding, becomes president and treasurer, **Commercial Filters Corp.,** Melrose, Mass.

Warren H. Brand, named director of engineering and research, **Conoflow Corp.,** Philadelphia.

J. C. Wessel, elected controller, **Ferro Corp.,** Cleveland.

Richard D. O'Brien, elected secretary, **Pressed Steel Car Co., Inc.**

Ivan L. Wiles, Thomas H. Keating and **Roger M. Kyes** elected members of the board of directors and of the Operations Policy Committee, **General Motors Corp.,** Cleveland.

J. Ralph Patterson, elected a director, **Kidd Drawn Steel Co.,** Aliquippa, Pa.

J. E. Callahan, becomes staff assistant to the vice-president, **The Garrett Corp.**

Earl F. Mayer, appointed controller, Hamilton Div., Hamilton, Ohio, **Clearing Machine Corp.**

Milton J. Steffes, promoted to chief engineer in charge of all design, field engineering development and new product engineering, **Super Tool Co.; Kenneth R. Fisher,** becomes sales manager; **Louis F. Szal,** promoted to works manager.

Earl E. Wesselhoff, named assistant chief engineer, in charge of development, **Morse Chain Co.,** new application engineering division within the Engineering Dept.

Robert L. Holloway, appointed chief engineer, Advanced Engineering Dept., Buffalo plant **American Machine & Foundry Co.,** New York; and **Herbert E. Oles,** becomes chief engineer, newly-created Buffalo Product Engineering Dept.

Samuel J. Lombardo, appointed sales engineer, Philadelphia district office, **E. W. Bliss Co.**

W. M. Owen, named assistant chief engineer in charge of personnel and training, Peoria, Ill. plant, **Caterpillar Tractor Co.**

Milton E. Case, appointed chief internal auditor, **Robertshaw-Fulton Controls Co.,** Greensburg, Pa.

Dr. David I. Sinizer, becomes project engineer, Metallurgical Research Dept., **National Research Corp.,** Cambridge, Mass.

Alex C. Kelley, named manager **Atlantic Steel Co.,** Fabricating Div., Atlanta, Ga.

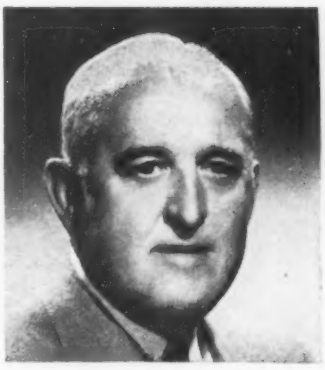
Loren B. Clay, appointed manager of tubular products and cold finished bar sales, Seattle Steel service plant, **Joseph T. Ryerson & Son, Inc.**

S. M. Osthagen, appointed manager, Providence District Office, General Machinery Div., **Allis-Chalmers Mfg. Co.,** Milwaukee.

Joseph F. Chalupa, appointed assistant works manager of Aviation Gas Turbine Div., South Philadelphia plant, **Westinghouse Electric Corp.**

S. H. NEWBURN, appointed president, Air Reduction Canada Ltd.

J. E. M. WILSON, elected vice-president in charge of sales, The Jeffrey Mfg. Co., Columbus, Ohio.



FRANK W. LADKY, appointed assistant to the president, Allegheny Ludlum Steel Corp., Milwaukee.

Personnel

Anthony F. Forni, appointed manager—sales planning and promotion, **General Electric Co.,** Plastics Dept.; and **Harold M. Patterson,** becomes manager, technical service unit.

Richard R. Pryor, named manager of air filter products sales, **Pittsburgh Plate Glass Co.;** and **James McGreevy,** appointed manager of battery products sales.

Oscar Hood, appointed sales engineer for the states of Texas and Oklahoma, **The Dayton Rogers Mfg. Co.**

Ben C. Wells, appointed superintendent, Blooming mill, Canton, Ohio plant, **Republic Steel Corp.**

Richard W. Hackett, joins the sales staff, **The United States Graphite Co.**

Vas Peickii, appointed factory manager, Los Angeles Plant, **The Micromatic Hone Corp.**

A. Dean Hunter, named division superintendent, Screw Machine Div., **Brown & Sharpe Mfg. Co.,** Providence.

R. L. Kaiser, appointed marketing development manager, **Magnus Chemical Co., Inc.,** Garwood, N. J.

C. W. Fisher, named assistant manager of Project and Technical Section, Chemical and Gas Dept., Engineering and Construction Div., **Koppers Co., Inc.,** Pittsburgh.

Patrick A. Kennon, promoted to assistant manager, Export Div., Oil Well Supply Div., **U. S. Steel Corp.,** Dallas.

E. G. Robbins, appointed general manager of construction, **Walter Kidde Constructors, Inc.**

Stuart N. Smith, appointed to newly created position, of works manager, Buffalo Aircraft Div., **Twin Coach Co.**

JOHN L. HALLETT, named vice-president in charge of aircraft production, Kaiser Metal Products, Inc., Bristol, Pa.

PAUL C. MEYER, made vice-president in charge of administration, Kaiser Metal Products, Inc., Bristol, Pa.

JOHN H. ZAUNER, appointed chief engineer, Mills Industries, Inc., Chicago.

C. R. BROWN, becomes assistant works manager, Painesville Plant, Diamond Alkali Co.

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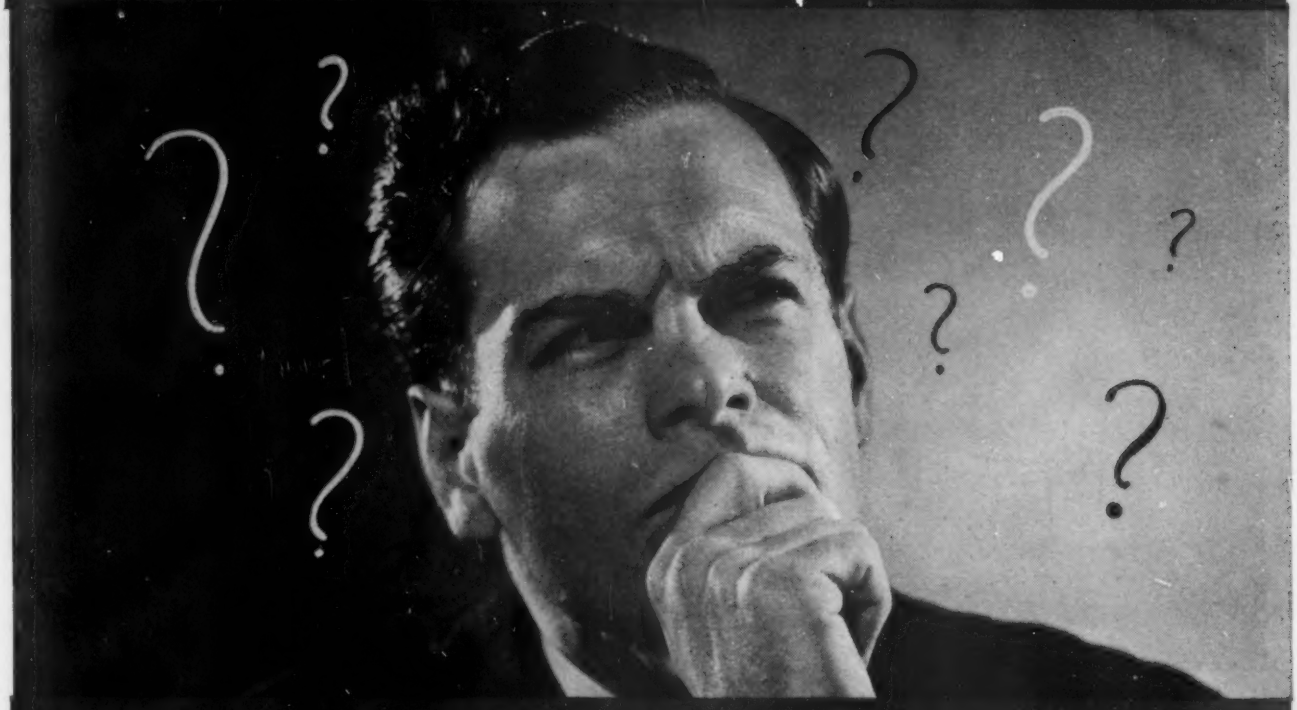

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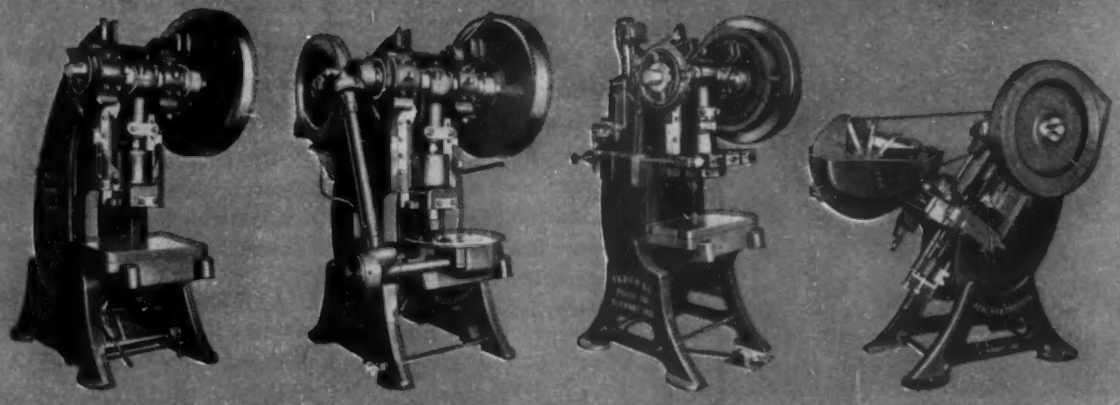

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—Personnel—

Albert R. Frame, appointed general manager of operations, **A. M. Byers Co.**

J. C. Dear, appointed assistant manager, Ammunition Research & Development Dept., Arms & Ammunition Div., **Olin Industries, Inc.,** East Alton, Ill.

Robert F. Lay, appointed assistant general sales manager, **The Cooper-Bessemer Corp.,** Mt. Vernon, Ohio; and **Eugene L. Miller,** becomes assistant general manager.

John W. Larson, becomes staff assistant, **Chance Vought Aircraft, Inc.,** Dallas.

Charles F. Lenhard, appointed plant manager, Cleveland plant, **National Can Corp.**

Al. E. Knazek, appointed district sales and service manager, Cleveland, Akron, Canton and Erie, **The Threadwell Tap & Die Co.**

T. J. Rancont, appointed district sales manager, Detroit branch, **The Producto Machine Co.,** Bridgeport, Conn.

Harold W. Kime, named assistant superintendent of stores, **Kaiser Steel Corp.,** Fontana, Calif.

S. Thomas Shimanski, appointed to new branch sales office, Madison, Wis., **The Trane Co.**

Dr. George L. Buc, joins the Central Control staff as technical assistant to president, **Fisher Scientific Co.**

George A. Grossman, appointed assistant sales manager, **The Barth Corp.,** Cleveland.

Wm. C. Bennett, appointed electrical engineer, **The Alliance Machine Co.,** Alliance, Ohio.

Anthony J. Ruscito, appointed to field engineering staff, **Sprague Electric Co.**

Paul R. Curtis, Jr., becomes products manager in charge of **Tube Sales, Sun Tube Corp.,** Hillside, N. J.

The Iron Age
FOUNDED 1855
Technical Articles

Good wear resistance—

Molybdenum Coatings Expand Uses of Metallizing

By A. P. Shepard
Chief Development Engineer
Metallizing Engineering Co.
Long Island City, N. Y.

◆ Wider application of the metallizing process is possible through the use of molybdenum coatings . . . They provide a surface material with good wear resistance as well as a bonding coat for other metals . . . Bonding method is simple and dependable . . . No preliminary surface preparation other than thorough cleaning is required.

◆ Sprayed molybdenum can be used on steel, titanium, aluminum and magnesium alloys with good results . . . When applied to smooth surface or open V threads it eliminates voids and provides good heat transfer . . . The material is now being used on all classes of metallizing work including shafts, pistons, valve rods, spindles and cylinder liners.

◆ SPRAYED MOLYBDENUM has greatly expanded the use of the metallizing process by providing a simple dependable bonding method and a surfacing material which shows extremely good wear resistance. It may be used on steel, titanium, aluminum and magnesium alloys whenever a good wearing surface is desired.

The application of sprayed metal to metallic bases until recently required rather elaborate and sometimes costly surface preparation. Several methods have been used, including grit blasting, rough threading, grooving followed by a rotary preparation tool, and electrically depositing porous nickel on the surface. All of these methods have some advantages and some limitations.

Blasting with sand is the only practical method of surface preparation for corrosion prevention metallizing on large outside areas, where the abrasive cannot be recovered. Steel grit or aluminum oxide blast abrasives are used on large areas where the abrasive can be recovered and reused. Steel grit or aluminum oxide are also used on machine elements to some extent. For many classes of work, however, this type of surface preparation does not provide an adequate bond. It also has a further disadvantage in that it requires considerable equipment.

Molybdenum may be applied to steel and many other metals by the metallizing process, with no preliminary preparation other than thorough cleaning. Sprayed molybdenum bonds by fusion to the base. It may be used as a bonding coat for other sprayed metals, or may itself be used as a wear-resistance coating.

Since it will not compete economically with abrasive blasting, sprayed molybdenum is not used as a preparation method for corrosion prevention on large areas.

Sprayed molybdenum can be used on hardened

Molybdenum has two important advantages . . . It is an excellent bonding material between metals and has exceptional wear resistance . . .

surfaces which cannot be readily roughened by mechanical means. It can be applied quickly and easily to parts set up in a lathe or grinder, so that the entire sequence of operations—undercutting, preparation, build-up and finishing—can be accomplished without changing the setup. It is fast, simple and requires no special tools. A very intimate bond is provided when it is applied to smooth surfaces, and when applied to threaded or grooved surfaces, it affords an extremely strong bond.

Some of the earlier bonding methods had certain limitations which are largely overcome by the use of molybdenum. The use of either the grooving method or the fused nickel method for example, will often result in voids at the sprayed metal or base metal interface. These voids reduce thermal transfer and impair the efficiency of drying or chilling rolls. Such voids also invite liquid seepage beneath the coating, in the case of hydraulic rams or high pressure pump plungers. Sprayed molybdenum, applied to a smooth surface or to an open V thread, eliminates voids and provides good heat transfer.

Has good wear resistance

A typical roll which has been salvaged by metallizing with 1/16 in. of a special aluminum bronze, applied over sprayed molybdenum is now in service. This molybdenum preparation is now being used on nearly all classes of metallizing work, including crankshafts, armature shafts, pump shafts, rams, pistons, valve rods, spindles, cylinder liners and many other items.

When molybdenum first came into use as a metallizing material, a variety of physical tests of sprayed deposits were made. The results did not indicate any very promising uses for sprayed molybdenum except as a bonding coat for other metals. It was known that molybdenum in the wrought form had not shown any outstanding advantages in resisting wear. There seemed to be no reason why sprayed molybdenum should be particularly good for such purposes.

It soon became evident, however, that sprayed molybdenum possessed remarkable properties in resisting wear of many types. Sprayed molybdenum has been applied to parts operating under a wide variety of conditions, and has established some very impressive performance records. Following are a few of these applications.

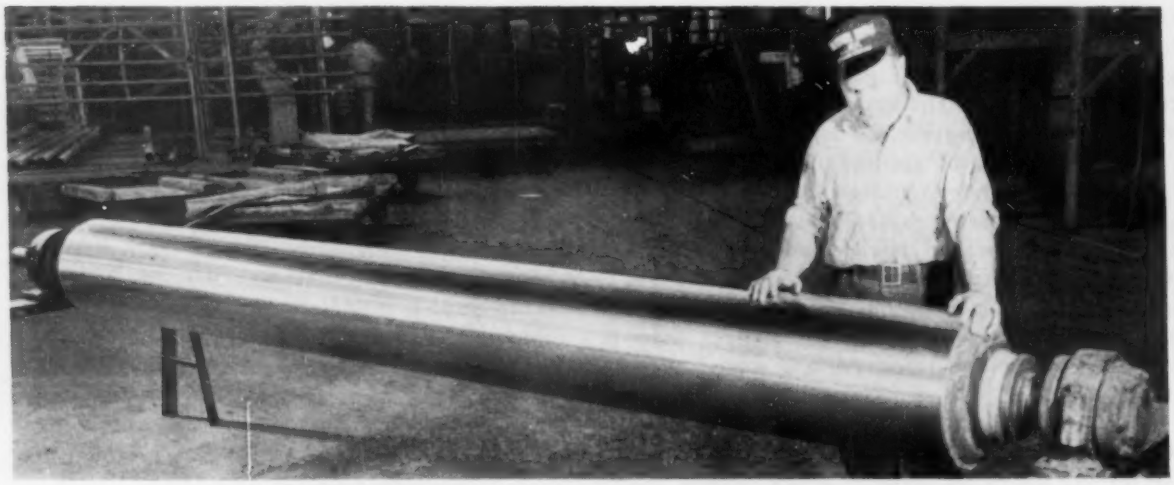
Spindles last longer

Pump rods used in steam pumps handling crude oil "bottoms" failed after 48 hr due to abrasive matter in the oil residue. Sprayed with a straight chrome stainless steel, these rods failed after four weeks. The first rod sprayed with molybdenum was in excellent condition after sixty-six days.

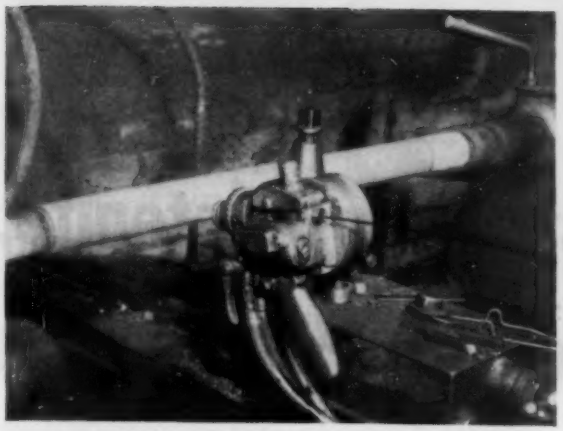
Textile spindles salvaged by metallizing with molybdenum last 3 to 5 times as long as those salvaged by chrome plating, and are salvaged at a lower cost. For a group of spindles which originally cost $3.50 to $6.00 each, the total salvage cost was less than $1.00 per piece and the molybdenum-sprayed spindles outlast new ones by a wide margin.

Automotive crankshafts which have been mismachined in one or more critical areas are being salvaged by spraying with molybdenum. One of the largest automobile manufacturers salvages crankshafts at the rate of ten per hour.

A large number of Diesel locomotive crankshafts have been metallized with molybdenum, and the performance has been exceptionally good. These crankshafts are subjected to conditions which are unusually severe; loads, speeds and temperatures are high.



TYPICAL roll salvaged by metallizing with 1/16-in. aluminum bronze over molybdenum.



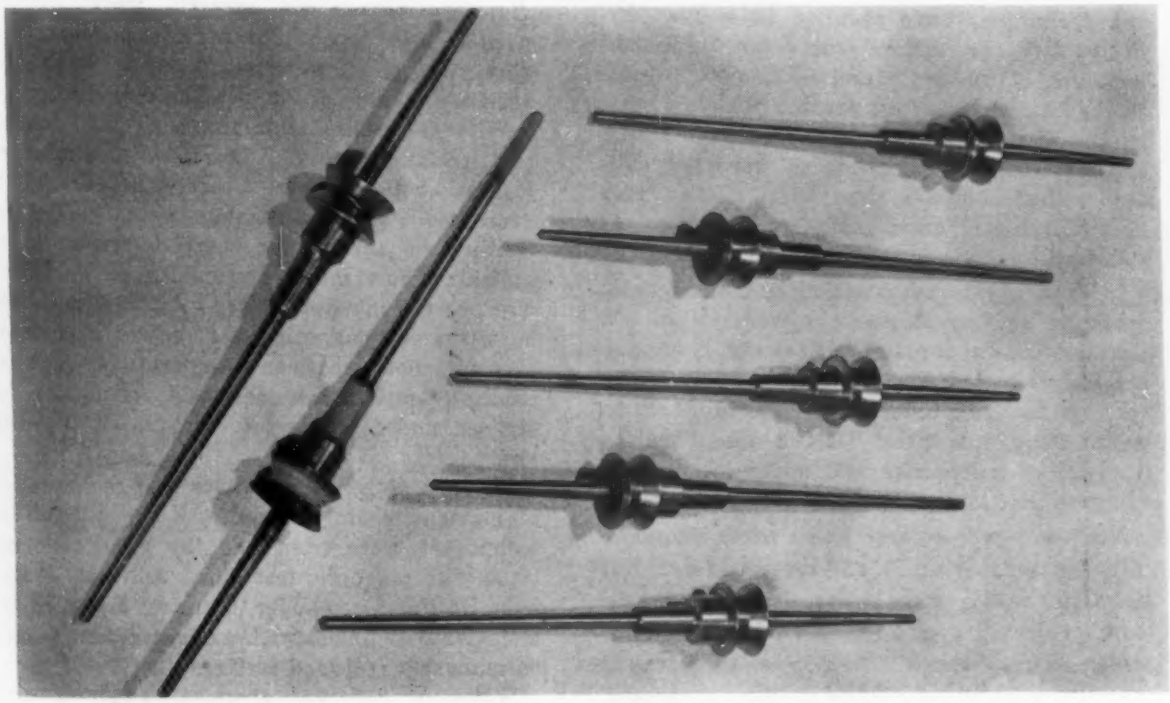
PUMP RODS used in steam pumps handling crude oil "bottoms" failed after 48 hr. Molybdenum sprayed rods lasted over 66 days.

REJECTED CRANKSHAFTS are salvaged by one of the large automobile plants by spraying with molybdenum at a rate of 10 shafts per hr.

One of the earliest applications of sprayed molybdenum as a wearing surface involved grinding spindles running in split tapered bronze sleeves. One manufacturer employed about 100 grinding machines of this type. New spindles were usually discarded after one to two weeks of 16-hr per day service. Eighteen months after the adoption of sprayed molybdenum wearing surfaces, not a single case of spindle failure had occurred. As a result, all spindles of new machines are sprayed with molybdenum, before the machines are put into service, and the purchase of new spindles for old machines has been stopped.

In restoring press fits sprayed molybdenum has proved to be extremely useful. Previous practice involved undercutting followed by one of the several methods of surface preparation. It was also necessary to apply a coating having a minimum finished thickness of at least ten mils. With sprayed molybdenum it is only necessary to clean up the surface, with emery cloth or by grinding and to apply a few mils of molybdenum. Finished coatings which feather off to zero thickness in places are entirely satisfactory. Standard interferences are used in calculating fits.

There are no entirely satisfactory theories as to just why sprayed molybdenum resists wear so well, under such a variety of conditions. It may be partly due to the "greasy" character of some of the molybdenum compounds which form in service. Certainly, molybdenum disulphide is a remarkable lubricant, and traces of this compound may be found where sulphur is present in the oil or in the surrounding atmosphere. Also, some of the oxides appear to have low-friction properties.



METALLIZING with molybdenum gives these textile spindles longer life than chrome plating.

In stainless wire—

Nondestructive Test Gives Austenite, Martensite Percentages

◆ A rapid, nondestructive test method has been developed to determine percentages of austenite and martensite in fine stainless steel wire . . . The method, combining both magnetic test and X-ray diffraction techniques, was developed to obtain data not easily obtained using standard metallographic methods.

◆ The method is based on the relationship of both remanence and coercive forces to austenite and martensite content . . . Wider use of the method, suitable for nondestructive production testing, may be possible.

By Samuel Storchheim
Engineer In Charge
Atomic Energy Div.
Sylvania Electric Products, Inc.
Bayside, N. Y.

◆ COMBINED USE of magnetic and X-ray testing techniques have resulted in a new nondestructive test method for determining percentages of austenite and martensite in cold worked as well as heat treated stainless steel wires. The method, developed because standard metallographic techniques were not suitable with the 0.004-in. diam wires studied, may be applicable in other instances where use of standard methods is impractical.

In studying transformation of nonmagnetic austenite to ferromagnetic martensite in 302 stainless wire as a result of drawing, it became necessary to find the percentage of austenite and martensite produced. It was difficult to mount these fine wires, 0.004-in. diam, and to resolve the martensite and austenite present using routine metallographic methods.

Next step was to test these wires magnetically for remanence, Br, and coercive force, Hc. Magnetic values were taken from hysteresis loops projected upon a calibrated oscilloscope screen. The hysteresis loop tester used was a specially designed instrument able to accept wires up to ⅛-in. in diameter. Wire test pieces had to be at least 3 in. long. For fine 0.004-in. diameter wires, six strands were usually needed to obtain accurate Br readings. Accuracy of the instrument was ± 5 pct for remanence, and ± 2.5 pct for coercive force.

With increasing percentage of cold reduction, remanence, Fig. 1, increased in a more or less parabolic manner. Coercive force, Fig. 2, decreased with increasing cold reduction. Neither remanence nor coercive force values indicated how much martensite or austenite was present in wires tested. After wires were heat treated, magnetic tests showed a correlation with heat treatment temperature. As heat treating temperatures increased, remanence decreased and coercive force increased, Figs. 3 and 4.

To get a better approximation of percentages of martensite and austenite, X-ray diffraction techniques were tried and the results correlated with magnetic test data. A North American Philips Co. Geiger Counter X-ray Spectrometer was linked with an instrument which permanently recorded test results.

Wires of different chemical analyses and magnetic parameters, and of known previous

cold reduction and/or heat treatment, were wrapped around small bakelite mounts. In wrapping, adjacent turns of wire touched each other. The specimen, presenting a flat, uniform surface in all directions, was mounted in the unit and a beam of X-rays impinged on the surface of the wire. As the X-rays struck the specimen, reflections were picked up by a horizontally mounted Geiger counter which moved in an arc around the specimen. Major locations of reflections were recorded as peaks on a chart.

Each peak represents a location of greatest intensity of X-ray reflection from the specimen. These locations can in turn be used to calculate "d" values of atomic interplaner spacings in angstrom units, Å.

Because the strongest lines (reflections) of 18/8 stainless steel are known, Table 1, the locations and intensities of reflections shown in the peaks could be used to determine whether martensite and austenite were present. Location of the peaks on the chart gave "d" values and identified the particular peak as representing either austenite or martensite. From these data, it was easy to determine whether the structure was martensitic, austenitic or a combination of both.

Data from all specimens were tabulated, Table 1, and from these values it was possible to plot various relationships. Fig. 5 shows a plot of remanence vs. the relative intensity or peak height for both martensite and austenite peaks, using Fe K alpha radiation with a Mn filter.

For the peak representing martensite d value of 2.03 Å, as relative intensity increases, remanence also increases. Also, as intensity increases, remanence decreases for the d value of 2.07 Å representing austenite. Both relationships indicate an exponential function.

Coercive force is plotted against peak height in Fig. 6. With increasing peak height, the coercive force increases for the austenitic peak and decreases for the martensitic peak.

At a remanence of about 1700 gausses, Fig. 5, peak heights for both austenite and martensite are approximately equal. At about 230 oersteds coercive force, Fig. 6, peak heights for austenite and martensite are equal. Below or above these values, one peak predominates.

Two conditions known

Where remanence was an absolute maximum, austenite peaks disappeared completely, indicating the structure, within the accuracy of the X-ray technique, was almost 100 pct martensite. Where austenite peaks were at a maximum and no martensite peaks were visible the structure was known to be almost totally austenitic. Thus, two conditions were known for which the approximate percentages of either martensite or austenite existed. It was then necessary to determine some relationship whereby approximate percentages of martensite and austenite could be determined either magnetically and/or by X-ray diffraction analysis.

A new approach was devised. It is known that both remanence and coercive force are functions, possibly direct or straight line functions, of the percentages of austenite and martensite present in the matrix.* The greater the amount of austenite, the greater the coercive force and the lower the remanence. Actually, three points

*Permanent Magnetic Properties In 18-8 Obtained by Cold Working, THE IRON AGE, Feb. 12, 1953.

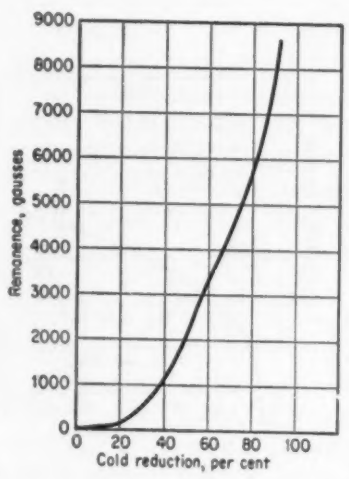


FIG. 1—Remanence induced in 18-8 stainless wire by increasing cold reduction.

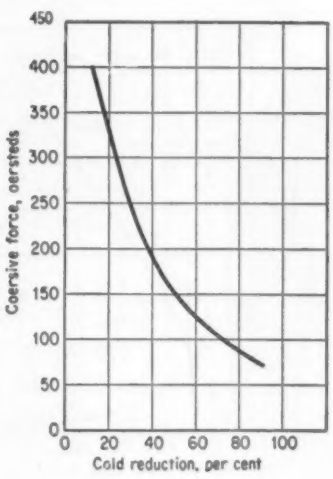


FIG. 2—Coercive force developed in 18-8 wire by increasing cold reduction.

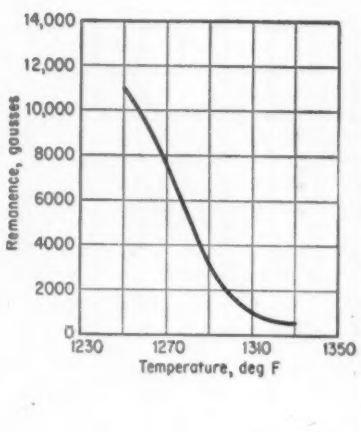


FIG. 3—How heat treatment affects remanence of cold worked 18-8 wire.

TABLE I

MAGNETIC AND X-RAY DIFFRACTION DATA FOR 18/8 STAINLESS WIRES

No.	Reduction, Oct	Heat Treat* Deg F	Type Radiation	Intensities of Peak Heights				Coercive Force, Oersteds	Remanence, Gausses
				Austenite d=2.07A°	Martensite d=2.03A°	Martensite d=1.44A°	Austenite d=1.79A°		
1	98	1300	Cu	30	None	None	12	408	600
2	98	....	Cu	None	33	10	None	80	7500
3	98	1260	Fe	48	8	None	12	432	1000
4	98	....	Fe	18	31	21	None	196	2530
5	98	1280	Fe	110	46	21	21	252	1600
6	97	....	Fe	None	96	33	None	40	7500
7	97	1330	Fe	112	8	None	24	320	200
8	36+	....	Fe	23	37	12	None	220	2540
9	97	....	Fe	None	102	36	None	40	7000
10	97	1330	Fe	112	11	7	21	360	266
11	21+	....	Fe	39	26	None	9	240	800

* Wire cold reduced 98 pct in area and heat treated at 1300° F in cracked ammonia atmosphere for 4 seconds. Wire was stranded through a 3-ft horizontal tube furnace at required speed.

on a plot of coercive force vs. per cent austenite are approximately known. These are: Zero per cent austenite equals approximately 40 oersteds; 100 pct austenite equals approximately 420 oersteds; 50 pct austenite equals approximately 230 oersteds. This latter point was obtained from Fig. 6 where it was assumed that when the austenite and martensite peak heights were equal, the percentages of martensite and austenite were about equal, i.e., 50 pct.

Fig. 7 is a plot of these data and the curve appears to be a straight line within the range of coercive forces used. This suggests the possibility that the direct relationship described does exist.

TABLE II

AUSTENITE vs. PEAK INTENSITY

Austenite, pct	Coercive Force, Oersted	I, Peak Intensity
100	420	112
82	350	76
68	300	51
50	230	28
42	200	20
16	100	5
0	40	0

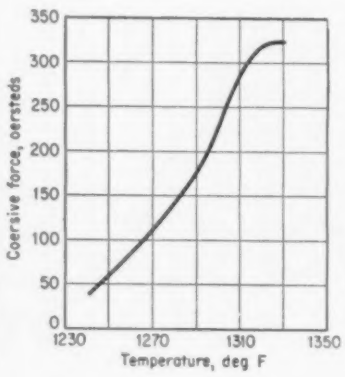


FIG. 4—How coercive force of cold-drawn 18-8 wire responds to heat treat.

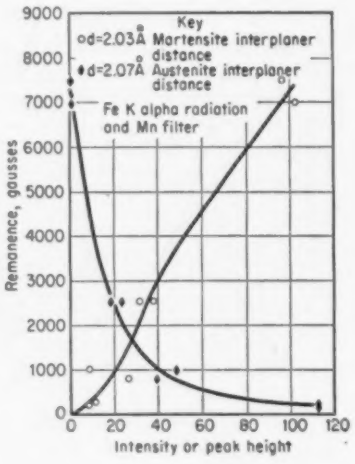


FIG. 5 — Relationship between X-ray peak height and remanence of 18-8 wire.

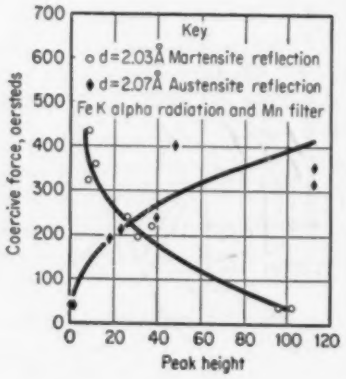


FIG. 6—Coercive force of 18-8 stainless steel shown as a function of peak height.

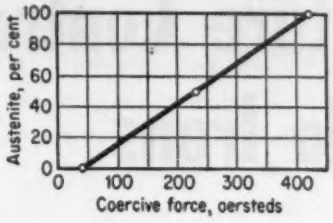


FIG. 7 — Percent austenite in cold reduced stainless wire vs. coercive force.

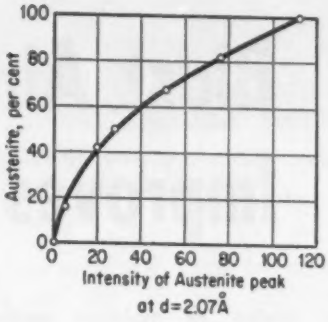


FIG. 8—Percent austenite in 18-8 steel as a function of austenite peak intensity.

Under these conditions only two points would be required to obtain Fig. 7. This curve represents the percentage of austenite in a matrix of cold reduced or heat treated wire vs. the coercive force of the wire. Thus, if a wire is drawn or heat treated, and tested for its coercive force, it is possible to determine the percentage of austenite. (When only austenite exists, remanence and coercive force are zero. An average of the maximum coercive forces developed where the wires exhibited low remanences was taken as the point of approximately 100 pct austenite.)

Several relationships now established relate coercive force with relative intensity of an X-ray pattern, Fig. 6, as well as percentage of austenite in a wire with the coercive force of that wire, Fig. 7. It is possible to relate the percentage of austenite in a wire to the intensity of the austenite peak produced on an X-ray pattern, Table II and Fig. 8. It is possible to take a specimen of unknown magnetic parameter, determine its X-ray austenitic peak intensity and then, in turn, refer to Fig. 8 and find the approximate percentage of austenite in the matrix.

There are now two nondestructive methods of determining the approximate percentages of austenite in cold worked as well as heat treated stainless steel wires, if magnetic parameters are used. If magnetic parameters are impossible to obtain and the intensity of the austenite peak by X-ray methods can be obtained, then the approximate percentage of austenite can be picked off, Fig. 8. It is presumed the wire is either wholly austenitic, wholly martensitic or a mixture of these two phases. Thus, if the amount of austenite is known, the percentage of martensite may be obtained by subtracting the percentage of austenite from 100.

ACKNOWLEDGMENT

The author wishes to thank the Wilbur B. Driver Co. for permission to publish this material.

SHARP PEAKS on chart, tied to X-ray spectrometer, represent reflections from specimens.

Blast Air Moisture Control Improves Cupola Irons

◆ Constant control of moisture content in cupola blast air has helped one company to get better quality and more uniformity in irons it produces . . . Both chemistry and physical conditions of cupola irons are improved.

◆ Use of dehumidifying equipment helps offset both daily and seasonal changes in humidity which affect quality of irons . . . A lithium chloride solution is used to absorb moisture directly from the blast air . . . Automatic controls simplify operation of the equipment.

By J. L. Brooks
Director of Metallurgy
Muskegon Piston Ring Co.
Sparta, Mich.

◆ IMPROVED CUPOLA IRONS with more consistent chemistry and as-cast structures have been attained through use of blast air with constant moisture content. Day-to-day and reason-to-season changes in atmospheric moisture content, often a caue of variation in chemistry and physical quality of cupola irons, have been minimized.

Constant moisture content is more important than bone-dry air, engineers of The Sparta Div., of The Muskegon Piston Ring Co., Sparta, Mich., believe. This company has obtained consistent results in foundry melting by maintaining a steady 3 gr per cu ft moisture content in the cupola air blast. Direct absorption of moisture by a lithium chloride base solution proved to be a practical and economical method of securing moisture control.

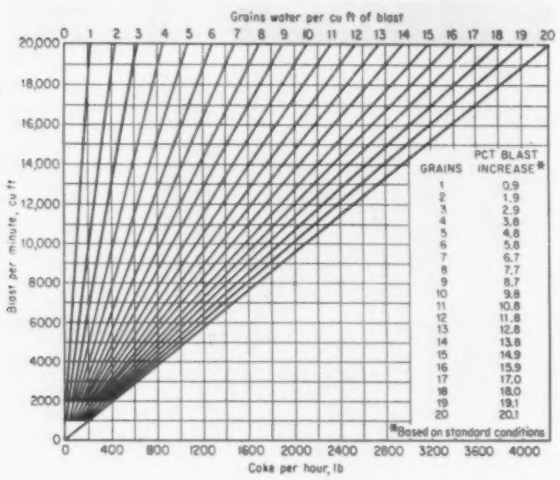


FIG. 1—Blast and coke adjustments necessary to compensate for moisture changes.

Increase in moisture content of blast air often results in lowered melting rate and changed metal quality. Normally, to compensate for these changes, adjustments are made in the coke charge along with the necessary volume change of the air. This requires constant attention and supervision to insure satisfactory results. Some time is required to stabilize conditions when a change is necessary. Thus, the more frequent the changes, when the moisture content varies, the more difficult it is to produce iron of uniform and satisfactory quality.

Fig. 1 shows the amount of coke that must be added to the base charge with an increase of moisture. For example, a cupola using 11,000 cu ft of air per min containing 7 gr of water per cu ft will require 800 lb of additional coke per hour. At 10.5 gr per cu ft, 1200 lb of coke per hour must be added to the base charge. Fluctuations of 6 to 10 grains occur within a single day. An increase of moisture content in the air blast will therefore require more coke per charge to maintain the metal temperature and produce iron of reasonably constant composition.

Increasing the coke charge affects the entire cupola operation. Additional carbon is necessary to react with the oxygen of the water. Since heat is necessary to produce this reaction, the temperature of the metal is affected. A 100° to 150°F higher metal temperature, by the use of preheated air, overcomes some of the detrimental

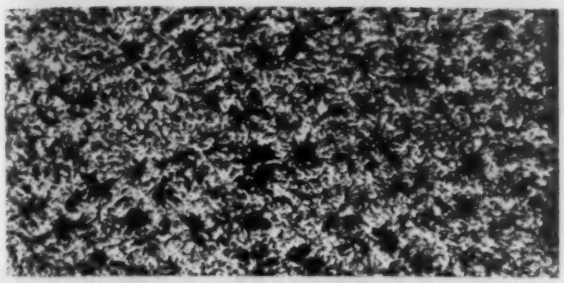


FIG. 2—Piston ring iron made under dry blast conditions of 3 gr moisture per cu ft. X100

FIG. 3—Piston ring iron made under dry blast conditions of 10 gr moisture per cu ft. X100

effects but does not overcome other effects of moisture on castings.

Moisture content effect on the chemical analysis of gray iron is shown in the Table. With increased moisture content, total carbon and silicon content decreases and combined carbon increases considerably. The chill depth also increases from 0.75 in. to 1.5 in. The temperature of the metal is lowered from 2580° to 2480°F as a result of the increased moisture content. Melting rate was also adversely affected.

Piston rings manufactured by Sparta become white and hard when the moisture content of the blast increases above a certain minimum. Structures resulting are shown in Figs. 2 and 3. The only variable changes in the making of these two samples was the blast air moisture. Moisture was 3 gr per cu ft for the iron in Fig. 2 and 10 gr per cu ft in Fig. 3. The marked increase in cementite in Fig. 3 sample is attributed to the increased blast moisture. Cupola operation can be adjusted to compensate for these adverse characteristics. However, each adjustment increases the chance of producing unsatisfactory metal.

In one study 17 heats were made, varying from 1 to 4 hr in length, with various coke ratios and blast rates. Moisture content was controlled by Kathabar equipment at various levels from 27 to 219 gr per lb. Increased moisture content significantly decreased tapping temperatures and carbon pickup. Changes in chemical composition due to the change in air moisture caused appreciable change in mechanical properties, chill depth, fluidity and iron microstructure. Adjustments of coke ratio and air blast only partially compensated for the detrimental effects of high moisture in the blast.

After trying refrigeration and other means of dehumidifying, this company used a system of passing the air through solid absorbents as their methods of removing moisture from air. The system automatically switches the flow of air from one bed of solid absorbent material to another on a definite schedule. While one bed was removing moisture from the air, another bed was being reconditioned by heating. The equipment was installed in conjunction with the hot blast system. The system was superior to the old refrigeration system and resulted in closer control and lower operating costs.

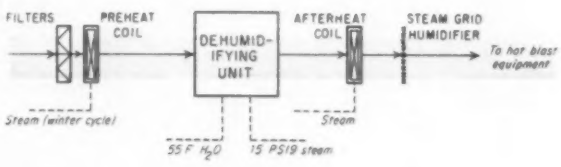
Kathabar absorption-type dehumidifiers manufactured by the Surface Combustion Corp., Toledo, were installed recently to maintain the moisture content of the blast at a constant 3 gr per cu ft. This system employs a lithium-chloride base solution as an air washer to remove the moisture from the blast air to any desired level. It is automatic in its operation. Regeneration of the absorbent solution is also continuous and automatic. This system has proved to be a very practical method of securing moisture control from a cost and performance viewpoint.

Regeneration simple, automatic

Summer cycle flow for this unit is shown in the drawing. When operating at maximum load, the 2200 cfm of air handled enters the system at 95°F, 144 gr per lb (10 gr per cu ft). After filtering, the air is passed into the air washer section where it is dehumidified to 40 gr per lb (3 gr per cu ft) and 75°F. Temperature and rate of coolant flow regulate the amount of dehumidification. When operating at maximum conditions 26 gpm of 55°F water is used.

After dehumidification the air is reheated to 105°F by an afterheating coil using 66 lb per hr of 15 psig steam. The 2200 cfm of air is then circulated to the hot blast system.

Regeneration is simple and automatic; about 10 to 15 pct of the absorbing solution is pumped continuously to the regenerator section of the unit. There the solution is sprayed over low pressure steam coils. This raises the solution temperature, forcing it to give off the absorbed moisture. The excess moisture is then picked up by a scavenger air stream and purged to the outside. For this maximum summer cycle, 440 lb per hr of 15 psig steam is used. When demand is less than maximum, proportionally smaller amounts of steam and water are used.



SYSTEM of absorbing moisture maintains content at a constant 3 gr per cu ft at all times.

Deep drawn parts—

Design Tooling for Complete Automation

By W. G. Patton
Asst. Technical Editor

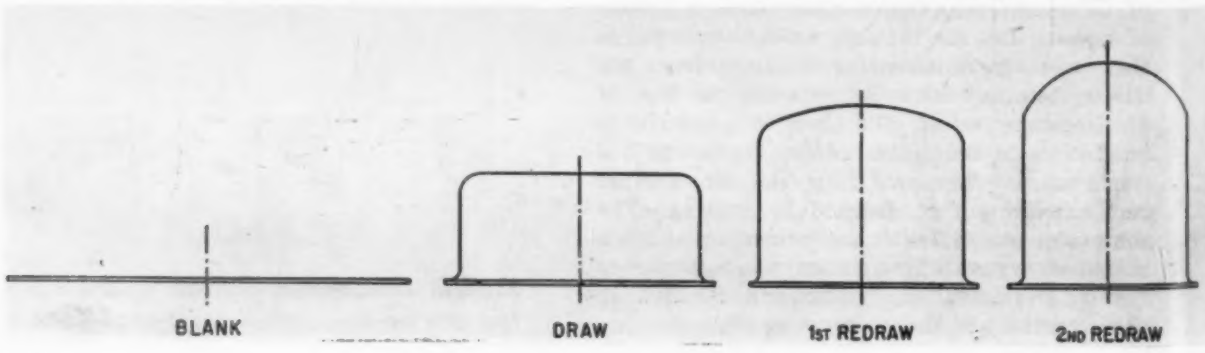
- **Transfer press dies have solved the problem of producing a large volume of deep drawn pressed metal parts at AC Spark Plug Div. without manual handling between operations.**
- **Progressive dies could not be used . . . Two large transfer bars move in between strokes of the press and transfer eight partially formed oil filter shells simultaneously to next forming station.**
- **Use of transfer dies permits maximum output per square foot of floor space and also results in more efficient use of steel to make the part.**

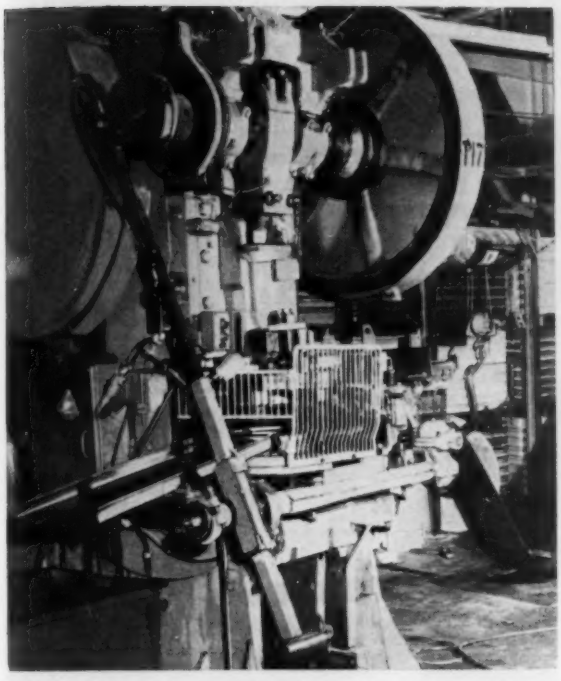
◆ TOOLING deep drawn parts for large volume production may present some interesting problems. For example, where a deep draw is involved—as in the case of an oil filter shell produced by AC Spark Plug Div. of General Motors —the problem of removing the partially formed stamping from the dies may eliminate progressive dies from consideration. In addition, the extra stock required for forming in progressive dies may represent a substantial element of cost.

At AC Spark Plug Div., deep drawn, oil filter shells are produced in large volume. In addition to the requirements for new cars, annual service demands are very large. Design of the part will not likely change from year to year. While a large investment in tooling can be justified to produce the volume of parts that is needed, extension of an established metal forming technique to a new field of operation was necessary to solve the problem.

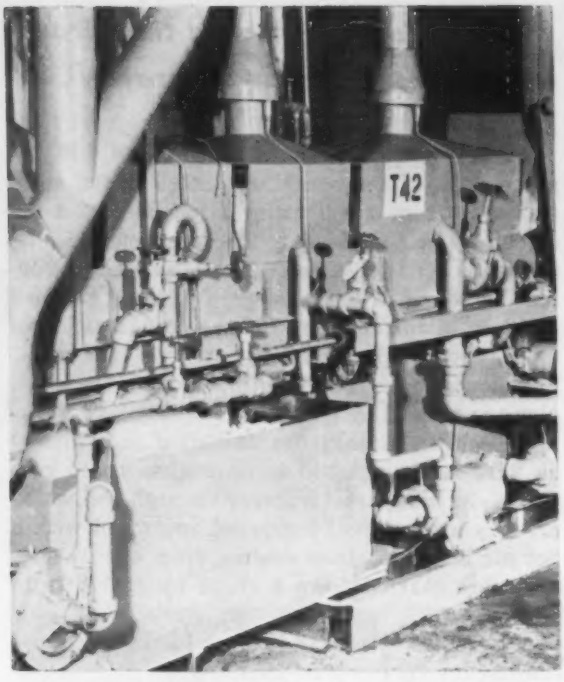
Transfer press dies are not new. For quite a few years, steel bars with metal fingers attached have been used to transfer small stamped parts from one station to the next. Between strokes of the press, steel bars with steel fingers attached, move in, pick up the part and move it ahead to the next station. The transfer bars retract, of course, before the press comes down for the next stroke. As the part is being formed, the transfer bar returns to its original position.

FORMING STAGES IN PRESS OPERATION

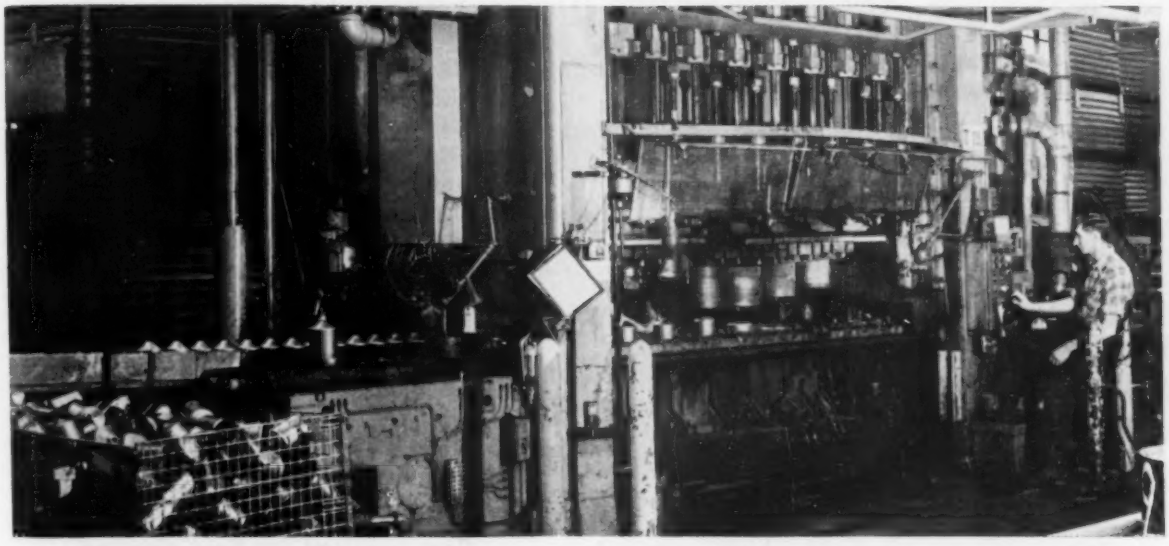




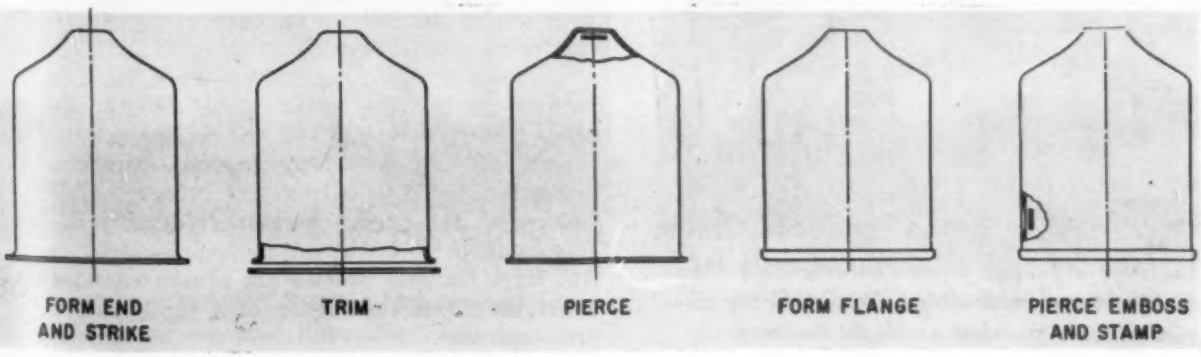
BLANKS are formed in this 450 ton Verson press. Scrap is minimized by working from the 12-in. diam blanks formed during this operation.



STEEL BLANK is transferred automatically by conveyor to this 3-stage washing machine unit following the blanking press operation.



TRANSFER BARS in this 8-stage transfer press, which move the partially formed steel blanks automatically from one station to the next, have a 14-in. stroke. Each bar moves 4 in. in and out.



"Dies can be removed from transfer press and used separately . . ."

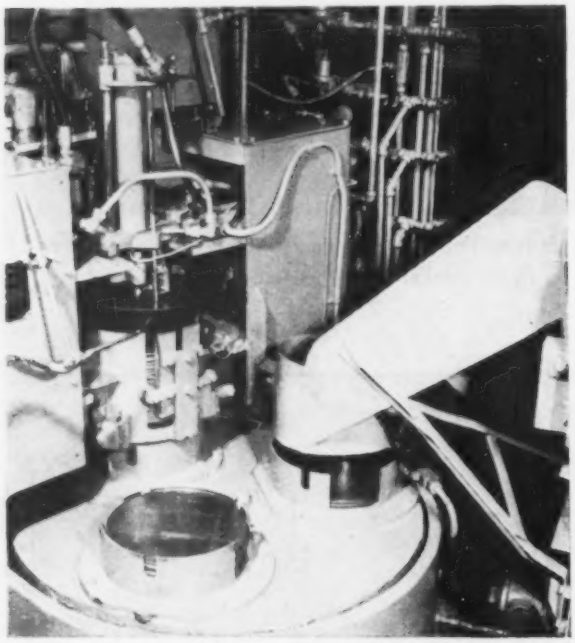
Tooling for oil filter shells involves 100 pct automation of the operation. Stock is fed automatically from a coil using a special feeder designed by AC engineers. The equipment is designed to feed 12⅛ in. 16 gage steel into a 450-ton Verson hydraulic press. The blank formed is 12 in. diam. Feeding of the coil is synchronized, with the blanking operation.

Following the blanking operation, the steel blank is carried by a conveyor to a 3-stage washing machine. Blanks are deposited individually on wire racks attached to an endless chain conveyor. As the parts progress through the washer, they are washed, degreased and dried with a hot air blast. As they emerge from the washer, parts are carried down a chute by gravity into an automatic, 3-station rotary stacker. As soon as a stack is built up to its capacity of 50 pieces, the stacker indexes automatically.

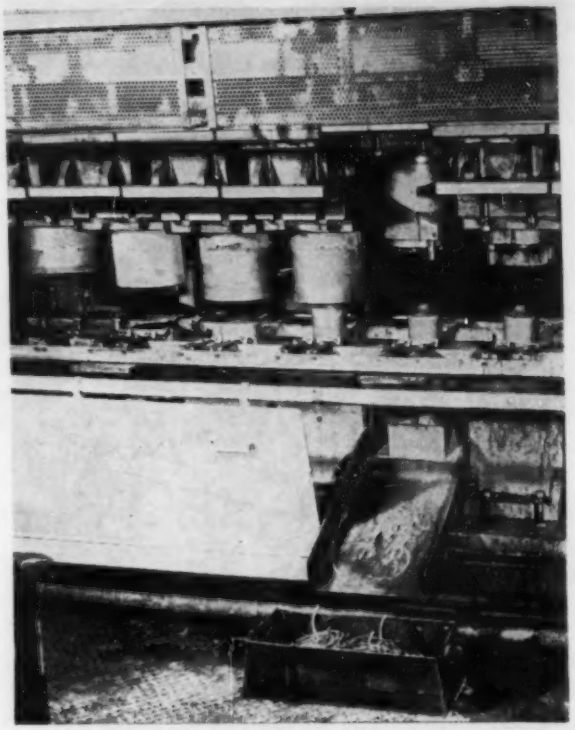
A suction device picks up the blank automatically from the stack and deposits it between small niches cut on the inside of each of the transfer bars. With each stroke of the press, the flat, unformed blank moves closer to the form dies. Just before reaching the form dies, final check is made to be sure that two or more blanks were not picked up simultaneously.

A schematic diagram on p. 114 & 115 shows the various operations performed in the Verson transfer press. These include draw, redraw, strike, trim and remove scrap, pierce, hem and pierce.

Movement of the transfer bar is synchronized with the 24 in. stroke of the press. The hydraulically actuated transfer bars have a 14 in. stroke. Each of the bars moves in and out a distance of 4 in. between strokes of the press. Movement of the transfer bars occupies about one-half of the press cycling time. The press is capable of operating up to 16 strokes per min.



ROTARY STACKER indexes automatically when 50 blanks are accumulated. A suction cup device deposits the steel blanks in the press.



FORMING sequence of transfer press (partially shown) starts at left. Box, foreground, catches scrap generated during trimming operation.

Each of the 8 form dies was designed and built individually. In the event of an emergency, these dies could be removed from the transfer press and used in individual presses.

To remove scrap generated by the trim operation at Station No. 5, two scrap cutters were inserted in the die. These cut the scrap rings into two parts, permitting them to slide down the side of the die into a collector box at the floor level.

Cam required for final piercing

Punchings resulting from two piercing operations fall down inside the press bed and are collected periodically. A cam die is required for the final piercing operation on the side of the shell.

Another feature of the press is the fact that each station has its own air cushion for returning the pads to die level.

An operator is on duty at all times. Control buttons are readily accessible. If trouble develops, the operator can stop the presses quickly, correct the difficulty and resume operations promptly. In addition to preventing possible damage to the press, operator supervision insures maximum production of quality parts. At AC, large transfer presses are always operated under the direct supervision of a highly skilled press operator.

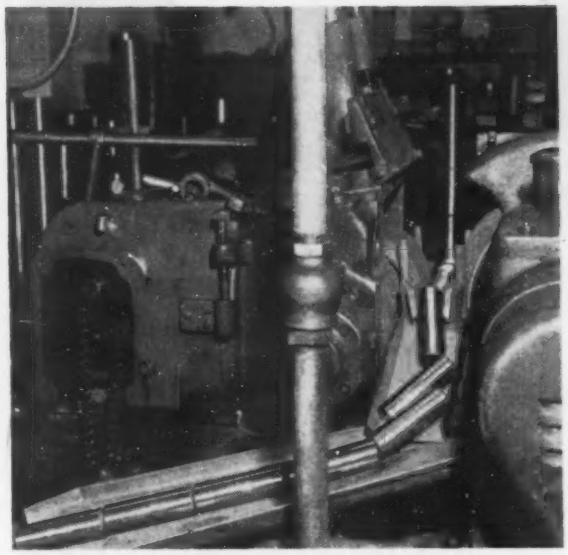
For flying shear—

Rebuilding Bearings Saves Time, Cuts Costs

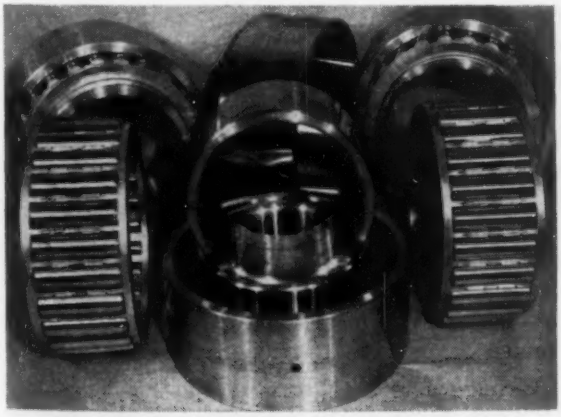
◆ REBUILDING of ball and roller bearings can save time as well as money. Recently Jones & Laughlin Steel Corp. had four used bearings from a Mesta flying shear reground in less than 30 days for considerably less than the cost of new bearings. New bearings would have required considerably longer to produce, according to Bearing Service Co., Pittsburgh, which did the job. J & L was able to coordinate the regrinding work with that of the mill in rebuilding the shear.

The bearings reconditioned for J & L were 24½-in. OD, 16-in. ID, and 8-in. wide. After arrival at the plant, bearings were disassembled and the rings checked for size and tolerances on all surfaces, for hardness, defects, amount of wear.

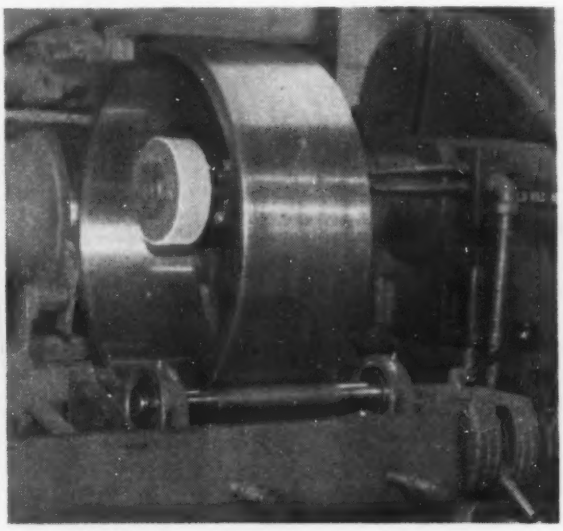
While the roller raceways were being reground, new oversize rollers were being machined and hardened. At the same time the cages, or roller separators, were going through various cleanings, inspections, and sizing and contour operations required to give the oversize rollers the proper fit in the pockets. Internal clearance in the flying shear bearings must be held to less than 0.001 in.



NEW OVERSIZE rollers for the shear bearings are ground to size on this Cincinnati grinder.



REBUILT BEARINGS ready for greasing, wrapping, and shipment. Rebuilding saved time.



REGRINDING roller raceway in the outer rings. Machine is a Heald centerless internal grinder.

For built-up parts—

Increase Tool Life in Machining Nickel Plate

By Norman Zlatin
Metcut Research Associates
Cincinnati

W. H. Prine
International Nickel Co., Inc.
New York

◆ Electroplated nickel provides hard, tough surface finishes for building up worn or over-machined parts . . . As a salvage method, it has several important advantages over other surfacing materials, one of which is its machinability . . . Best machining results are obtained using high-speed steel tools at cutting speeds of 100 fpm and cast alloy tools at 150 fpm.

◆ For soft nickel plate, cutting speeds can be increased by 50 to 100 pct . . . Best tool geometry: back rake—0°; side rake—10°; side cutting edge angle—10°; end cutting edge angle—5°; relief—5°; and nose radius —0.002 in. . . . Feed of 0.002 ipr gives the best surface finish.

◆ ELECTRODEPOSITED nickel, usually thought of as a decorative or protective surface finish, has merit for building up worn and over-machined parts. Although such deposits are hard, tough and shock-resistant, they are machinable. To develop the best machining characteristics for nickel-plated surfaces, International Nickel Co. and Metcut Research Associates undertook a cooperative test program.

Advantages of nickel plating over other build-up methods are: (1) mechanical properties of the base metal are not affected since no heat is used; (2) physical properties of the electro-deposited metal are reproducible over a wide range of values; (3) deposit thickness is controllable to minimize final machining; and (4) the electrodeposited coating will adhere tightly to the base metal.

Chromium and iron are also used to build up metal parts. But nickel and chromium offer the advantage of corrosion protection and are most frequently used. In comparing deposits, chromium exhibits high hardness and low coefficient of friction, while the tougher, more more-resistant nickel deposits may be applied faster and more evenly.

To incorporate the advantages of both metals, where finish machining is not required, parts to be salvaged are frequently plated first with nickel for the bulk of the buildup and then with chromium for surface hardness and low frictional characteristics.

Since hard machinable nickel deposits are most likely to be used for part salvage, most test work was done on this type of plate. Some comparative results were obtained for soft nickel deposits.

Machining of nickel plating is usually a finishing operation in which, with proper control of plating thickness, depth of cut would be 0.005 in. or less. The tests consisted of turning successive layers on heavily nickel-plated bars. These bars were low-carbon steel of about 1¾-in. diam. Thickness of the nickel deposits ranged from 0.050 to 0.070 in. Average hardness of the so-called "hard" deposits was 43 Rc whereas

the soft nickel deposits averaged 79 RB.

The degree to which the plated surface work hardened after machining was measured at the start of the test program. This was considered important, for if the machined surface work hardened appreciably, results of successive cuts would not be comparable to those taken on a plated surface not previously cut. The hard nickel plating showed no signs of work hardening due to machining, while the soft deposit did work harden. This was not serious since most machining tests were made on the hard nickel plate.

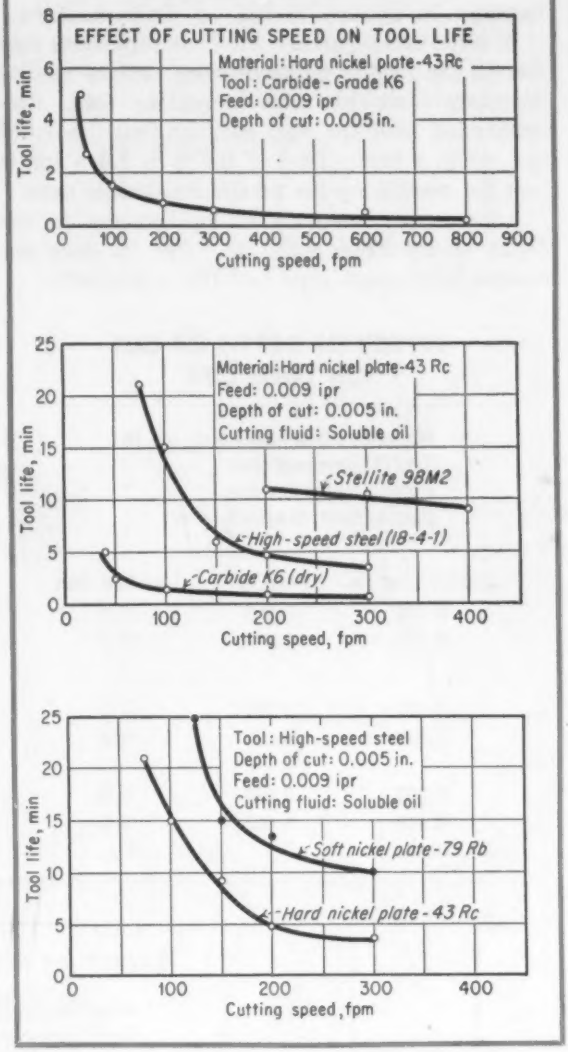
Tool life results on the hard nickel plating were obtained for carbide, cast alloy, and high-speed steel tools. A wide variety of carbide tool grades were tested over a range of cutting speeds from 40 to 800 fpm. A straight tungsten-carbide grade proved best, but even so, tool life was only 5 min at a cutting speed of 40 fpm. Neither changes in tool geometry nor the addition of a water base cutting fluid improved tool performance. Changing the feed over the range 0.005 to 0.020 ipr also had no major effect on carbide tool life.

Steel tools last longer

Tool life with high-speed and cast alloy tools was considerably greater than with carbides. To obtain a 10-min tool life, cutting speed for the carbide tool would have to be less than 50 fpm, while with the high-speed steel tool, cutting speed could be over 100 fpm and over 200 fpm with the cast alloy tool. However, recommended turning speeds are 100 fpm for high-speed tools and 150 fpm for the cast alloy type.

In terms of minutes, tool life appears to remain independent of feed above 0.005 ipr. But heavier feeds indicate a definite tool life ad-

CUTTING SPEED VS. TOOL LIFE



SURFACE FINISHES FOR VARIOUS MACHINING FEEDS

Material: Hard nickel plate (43Rc)
Tool: High-speed steel

Back rake: 0°
Side rake: 15°
Side-cutting edge angle: 0°
End-cutting edge angle: 5°
Relief: 5°
Nose radius: 0.002 in.
Cutting speed: 100 fpm
Depth of cut: 0.005 in.
Cutting fluid: Soluble oil

Feed, ipr	Surface Finish, microinches
0.002	25
0.005	30
0.009	45
0.015	65

HOW TO MACHINE NICKEL-PLATED PARTS

Use high-speed steel tools at cutting speed of 100 fpm on hard nickel deposits, or cast alloy tools at 150 fpm.

Increase cutting speed 50 pct for soft nickel plate.

Best all-around tool geometry is:

Back rake—0°	Side rake—10°
Side cutting edge angle—10°	End cutting edge angle—5°
Relief—5°	Nose radius—0.002 in.

Best surface finish is with feed of 0.002 ipr.

For best combination of tool life v. surface area machined, use a feed range of 0.010 to 0.015 ipr.

Water-base cutting fluids are recommended.

vantage in square inches of area machined.

In some cases, surface finish requirements may dictate the feed to be used, since surface quality decreases somewhat with increasing feed. Recommended feed for best surface finish is 0.002 ipr, while a heavy feed of 0.010 to 0.015 ipr is best for machining the maximum surface area.

Another test shows that an increase in the depth of cut from 0.005 to 0.010 in. does not change high-speed steel tool life appreciably.

Comparison between the machining characteristics of soft and hard nickel deposits shows that the soft plate could be machined at 50 to 100 pct faster than the hard type of electroplated nickel deposit.

Recommended tool geometry for machining both hard and soft nickel plated areas is: Bask rake, 0°; Side rake, 10°; Side cutting edge angle, 10°; End cutting edge angle, 5°; Relief, 5°; Nose radius, 0.002 in.

EFFECT OF DEPTH OF CUT ON TOOL LIFE

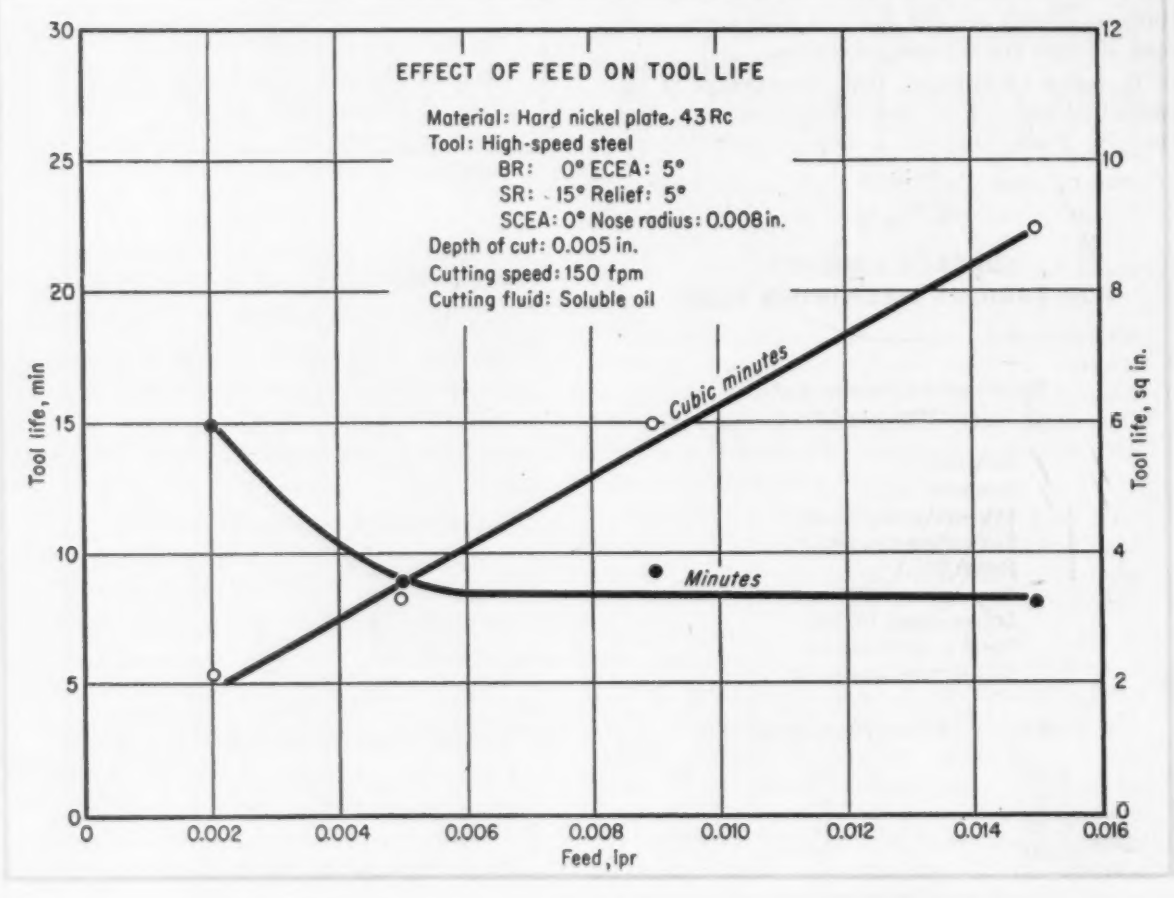
Material: Hard nickel plate (43 Rc)
Tool: High-speed steel
Cutting speed: 200 fpm
Cutting fluid: Sulphurized oil

Depth of Cut, in.	Feed, ipr.	Tool Life, min
0.005	0.002	11.0
0.010	0.002	11.5
0.005	0.005	4.7
0.010	0.005	4.5
0.005	0.009	3.0
0.010	0.009	3.5

HARDNESSES ON UNMACHINED AND MACHINED SURFACES

Tool: Carbide Grade K6—Type AR-8
Feed: 0.005 ipr
Cutting Speed: 50 fpm on hard plate
100 fpm on soft plate
Depth of Cut: 0.005 in.

Plating	No. of Cuts	Knoop Hardness 100g	Knoop Hardness 500g
Hard	0	435	400
	1	390	380
	7	395	385
Soft	0	210	177
	1	310	250
	3	402	300
	7	348	278



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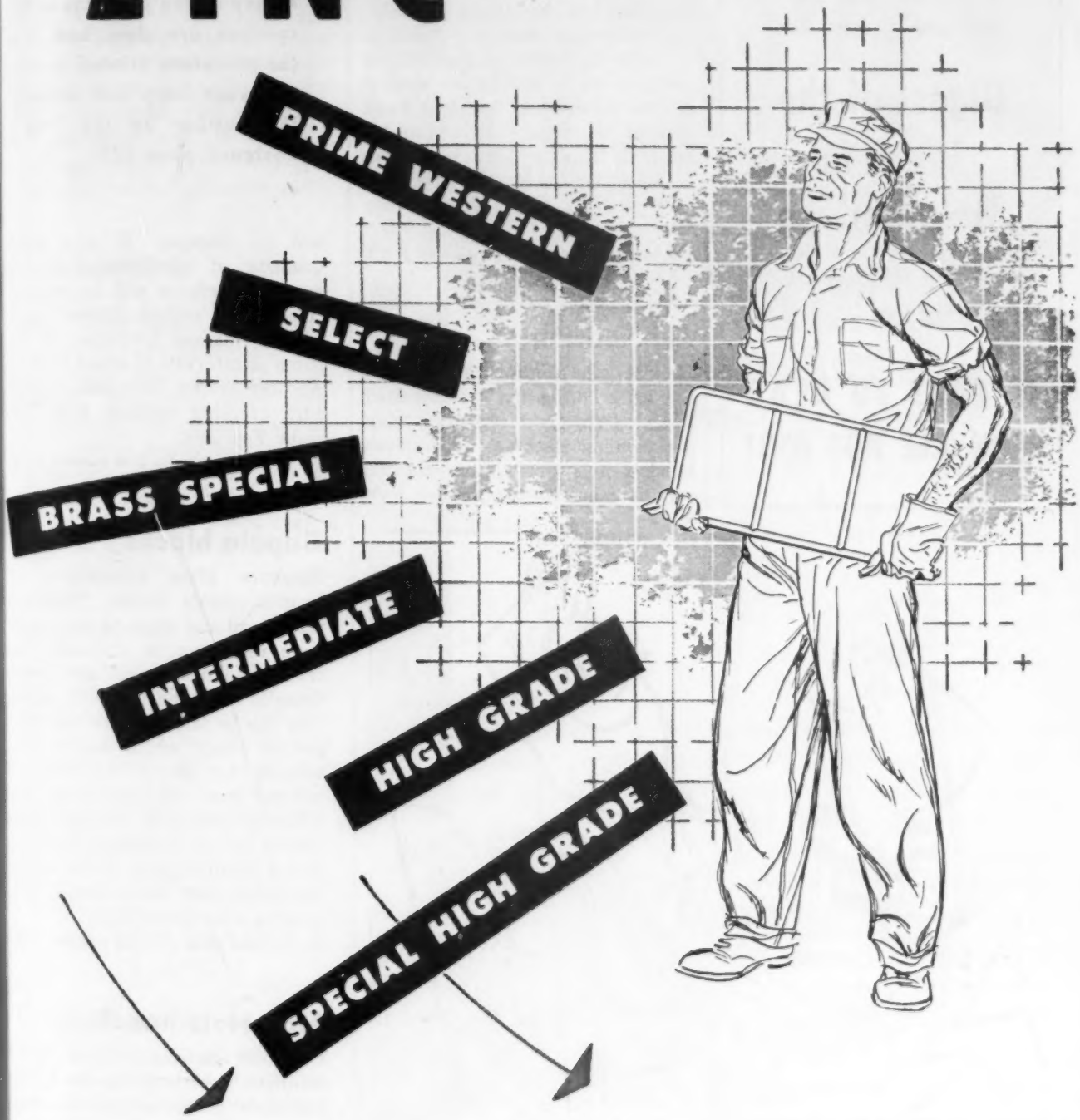

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Digest of the Week in Metalworking

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Technical Literature

Hydraulic presses

Elmes offers a complete line of standard presses from 50 to 300 tons designed specifically for molding reinforced plastics. Press is operated by means of pushbuttons mounted on a pushbutton control station attached to the right hand side of the press. An adjustable timer is also provided which can be preset for the length of the cure cycle desired. *Elmes Engineering Div.*

For free copy circle No. 1 on postcard, p. 127.

Lubrication

Booklet offers information about the King lubrication systems used in the company's vertical boring and turning machines. The splash lubrication system's two principal service requirements are oil level and oil changes. If level falls, quantity of oil splashed to the wearing surfaces will be reduced. "One shot" system depends upon regular manual actuation of the pump at intervals of about 4 hours. Another system discussed is pressure greasing method. *King Machine Tool Div.*

For free copy circle No. 2 on postcard, p. 127.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 127.

Cupola blocks

Brochure gives information of Ironton cupola blocks. They are made hard and dense to give maximum resistance to abrasion, slag action and mechanical shock. Because of their sharp, smooth edges, they can be laid up with very thin mortar joints which makes them suitable for lining the well and melting zone. Illustrated are the different types and sizes of blocks offered by the company. Also included is information on ladle pouring brick and ladle bottom tile. *Ironton Fire Brick Co.*

For free copy circle No. 3 on postcard, p. 127.

Materials handling

Pamphlet announces a new line of standard electric trucks to handle materials at lowest possible cost. These trucks can be maneuvered into difficult areas and take full advantage of storage space. Minimum overall weight is maintained by complete fabrication, providing maximum strength for the toughest jobs. *Clark Equipment Co.*

For free copy circle No. 4 on postcard, p. 127.

Daddy, you keep calling Superman "Superdie". (SUPERDIE® is Daddy's favorite die steel).

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.

Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

TOOL COLUMBIA STEELS

Separators

Pamphlet describes uses of Basco separators. The unit comprises permanent magnets that induce a magnetic field in the stacked steel sheets or laminations, which tend to repel each other, causing the top sheets to fan out with air space between them. Plates are separated sufficiently to place fingers between sheets. No matter what protective substance is on the sheet they cannot stick together. *Basco Mfg. Co.*

For free copy circle No. 5 on postcard, p. 127.

Metal cutting

Two-color, 17 x 22½-in. chart is offered which tabulate metal cutting data on hand, power and band saws. Three tables simplify blade selection. Printed in large type, they indicate the correct blade to use in cutting nearly forty different materials. Hints on how to avoid common saw troubles are also outlined. *Victor Saw Works Inc.*

For free copy circle No. 6 on postcard, p. 127.

Sheet metal

Catalog presents a cross-section of sheet-metal specialties for specific applications. Divided into sections, the catalog has illustrations of machine bases, lathe pans, cabinets, trucks and racks, tanks, pans and boxes and miscellaneous items. Company is prepared to fabricate any variety of sheet metal specialty to specifications. *Cincinnati Ventilating Co.*

For free copy circle No. 7 on postcard, p. 127.

Cold extrusion

Possible applications of cold extrusion and how this fabrication method affects design and production are described in a new booklet. With the cold extrusion process a one-piece part is produced in one operation and greater freedom in design is made possible. *Mullins Mfg. Corp.*

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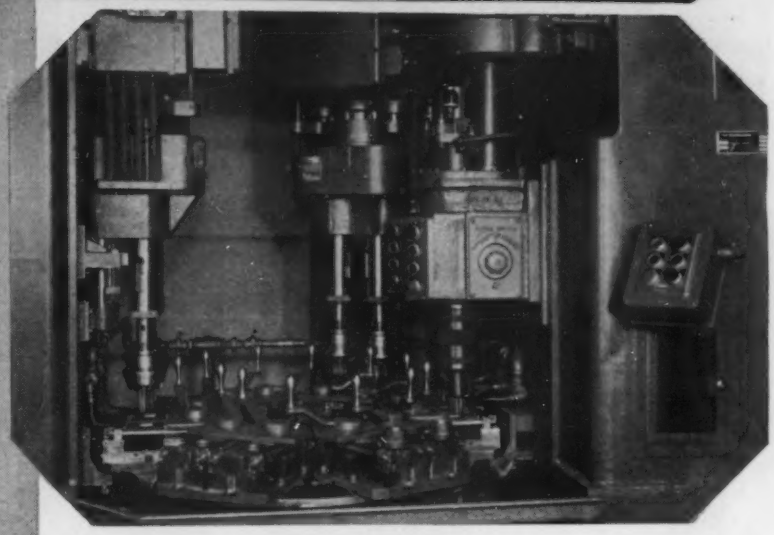
Turn Page

Another Cleveland Design to Speed Production!



COMBINATION CLEVELAND REAMING AND TAPPING MACHINE

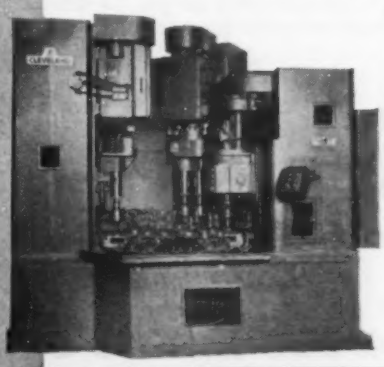
OPERATION: Rough taper ream two parts at a time. Finish taper ream two parts at a time. Tap with taper pipe tap two parts at a time.

PARTS: Union End Forgings.

PRODUCTION:

Size	*Parts Per Cycle*	*Prod. at 100% Efficiency*
1¼"-11½	2	316 per hour
1½"-11½	2	256 per hour
2"-11½	2	200 per hour

A vertical combination machine consisting of a heavy duty Cleveland 21" Power Index Table, mounted on an all welded and normalized steel base with columns on the rear of the table supporting two drill units, each with a two spindle head and one Cleveland Model F-2 two spindle heavy duty tapping unit.



Mounted on the top plate, twelve hand operated locating and clamping fixtures, with interchangeable jaw sets.

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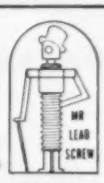

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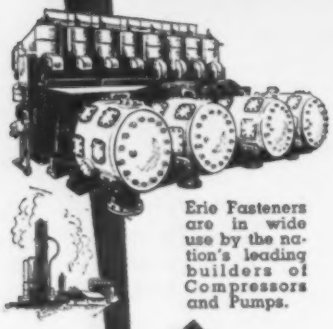

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Grinding

Pamphlet gives information and illustrations on Sterling chuck and segments for surface grinding. Chucks are lightweight and not complicated, and are easy on bearings. Powerful, positive segment grip is supplied by individual mountings which are regulated by a twist of a socket wrench. Sterling segments are identical in design and fit the chucks rigidly and firmly until released. They can be readily replaced without loss of time. *Sterling Grinding Wheel Div.*

For free copy circle No. 9 on postcard, p. 127.

Motor brakes

Booklet gives information and illustrations of the Dinabrake motor. Braking torque can be calculated to effect full stop from 1800 rpm within one-half revolution. Braking action is smooth and continuous throughout braking cycle, no shock or bumps are transmitted to the driven machine. The motor is designed for applications where braking is required to effect adjustment and positioning. Control is simple and inexpensive. *Standard Dayton Corp.*

For free copy circle No. 10 on postcard, p. 127.

Equipment news

Brochure gives information of new hot copper rod rolling mill with 10 Farrel two-high stands. Self-contained tandems provide semi-continuous production of round rods. The rolls are chilled iron, mounted in roller bearings and connected to their pinion stands by universal spindles. Also described is the Sendzimer mill for cold-rolling 48-in. strip at 1500 fpm. *Farrel-Birmingham Co., Inc.*

For free copy circle No. 11 on postcard, p. 127.

Trailability

How trailability determines tractor-trailer aisle widths is the subject of a new folder. Setting aisle-widths to take advantage of maximum floor area without interfering with materials handling is an important consideration for any cost conscious firm. *Mercury Mfg. Co.*

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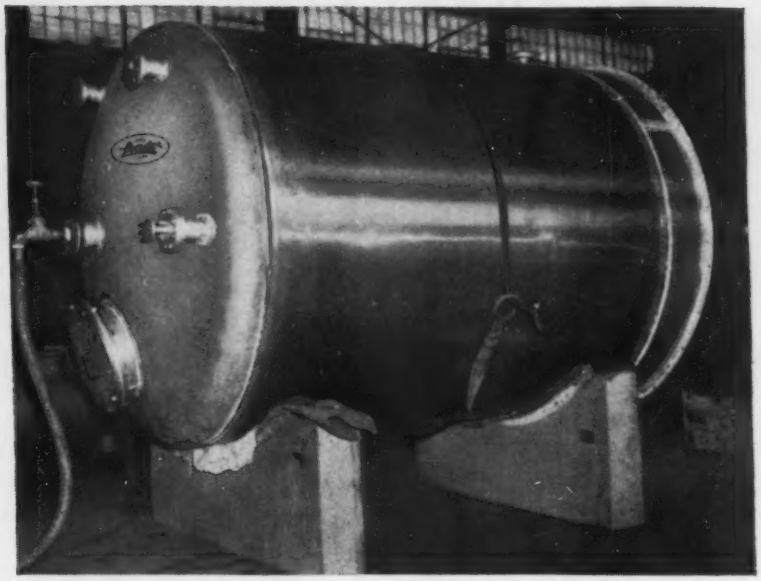
Turn to Page 127

RADIOGRAPHY makes positive about negative pressure



Specifications for this tank—designed to operate from vacuum to 25 pounds' pressure—called for welded 2S aluminum. This, as welders know, could cause problems. But the builders called on radiography. Here is what they say:

"X-rays played a very important part in the extensive research to determine the most suitable method of welding the vessel. Without the use of x-ray we might never have obtained the high quality and uniform results."

Which shows two important facts. First, that radiography proves the soundness of welds. Second, that it expands the use of the welding process.

This is good reason that today more and more welders make use of radiography. If you would like to know how it can help your business, get in touch with your x-ray dealer and talk it over.

EASTMAN KODAK COMPANY
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another important example of Photography at Work

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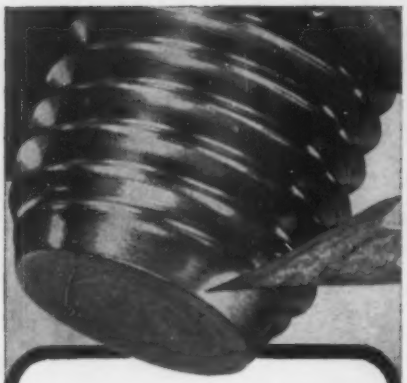

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Allen

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Dropping, knocking against metal surfaces and faulty line-up are major causes of damaged threads. Allen's new unthreaded leader point substantially reduces the causes of screw thread injury, or damage to threaded holes. Grip Heads, precision fit sockets that adhere to the key, *plus* the new leader points, make Allens the world's easiest starting cap screws, particularly in inaccessible spots. Sold *only* thru leading Industrial Distributors.

ALLEN
MANUFACTURING COMPANY
Hartford 2, Connecticut, U.S.A.

Fabrication:

Giant clamshell will house propellers during tests.

Dynamic "unbalance" of airplane propellers at high speeds will be measured in a giant clamshell recently fabricated by Lukens Steel Co. for Hamilton Standard Div. of United Aircraft Corp., Windsor Locks, Conn. The two steel bowls for the testing device weigh more than 22 tons.

Used 1¼-in. Plate

The two heads for the Clamshell were spun on a flanging machine at Lukens' Coatesville, Pa. mill. Each was fabricated of two 1¼-in. steel plates, welded together and cut to a disk 281 in. in diam.

Final diameter of the heads is 20 ft 6 in. To give the assembled chamber the depth required for a revolving propeller and instruments, a cylinder of the same diameter was welded to one of the heads. Flanges on both heads were machined to give the tight fit required.

Machined to Fit

Although it would have been possible to fabricate the heads by welding segments together, it was considered more economical to spin them. One of the technical drawbacks thus overcome was the difficulty of otherwise achieving the accuracy required in the circular dished shapes.

Following the spinning of the giant heads, Lukens' Lukenweld Div. completed the fabrication of the entire Clamshell assembly. The shallower of the two heads was fitted with supports which would allow its installation in an upright position as the stationary half of the shell.

Heads Spun to Shape

The other head, fitted with similar supports, was mounted on a 4-wheel carriage designed to run on rails to and from the fixed shell. Other fabrication details designed and installed by Lukenweld included an air circuit assembly and a drive and electrical assembly for the carriage.

Add Weights for Balance

When it goes into operation, the Clamshell will be used to test all propellers made at Hamilton Standard. Measurements and adjustments will be made while the propeller turns inside the chamber.

Hamilton Standard engineers explain that propellers statically balanced on a system of knife-edges—a standard test procedure—are not necessarily dynamically balanced at high speeds.

By evacuating the chamber, aerodynamic effects on the revolving propeller blades are eliminated. Consequently, any "unbalance" that shows up can be considered strictly due to mass and can be corrected by adding weights to the blades.

Air can be evacuted from the chamber to simulate lower pres-

Shell for testing props . . .

IF YOU WANT MORE DATA

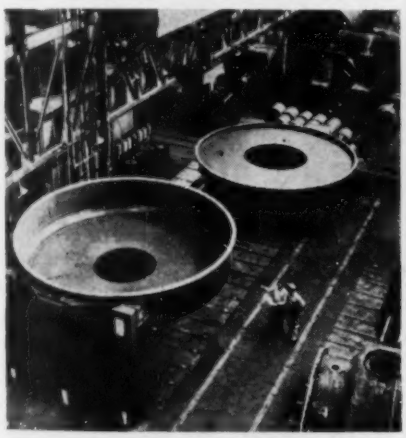
You may secure additional information on any item briefed in this section by using the reply card on page 128. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

sures encountered by airplanes at altitudes up to 115,000 ft. Propellers up to 19½ ft in diam—among the world's largest—can be tested in the unit.

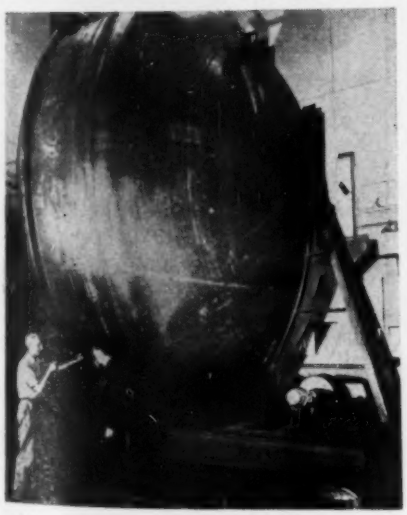
Transportation Problems

Not the least of the problems encountered by Hamilton and Lukens engineers, was transportation of the oversize heads from Lukens' Coatesville mill to the propeller plant near Hartford.

Since they were much too large to travel the 250 miles overland, the problem was finally solved by shipping them by tug-towed barge up the New Jersey coast, through Lond Island Sound, and up the Connecticut River to Hartford, a distance of some 400 miles. From Hartford to their destination at the Hamilton Standard plant in Windsor Locks, the heads went by truck, with police escort.



Dished heads were spun . . .



Heads fit smoothly . . .

HOW MANY OPERATIONS WHEN YOU PREPARE STEEL FOR PAINTING?

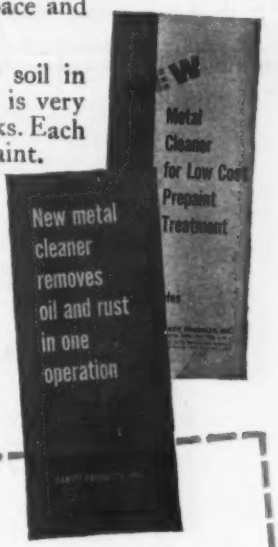
	Operations
Cleaning	1
Rinsing	1
Pickling	1
Rinsing	1
Conditioning	1
Rinsing	1
Drying	1
Total	3

What's wrong with that addition? How can seven operations add up to three operations?

It's easy when you use Oakite Compound No. 33 (or Oakite Compound No. 31) to remove rust or heat scale *at the same time that* it removes oil *at the same time that* it prepares steel (or aluminum) for the lasting adhesion of paint.

That combines cleaning, pickling and paint conditioning into one operation. After rinsing and drying, you have saved the time, the tanks, the space and the solutions for four operations.

O. C. No. 33 is great for removing heavy soil in tanks or for cleaning by hand. O. C. No. 31 is very economical for removing moderate soil in tanks. Each compound is able to strip certain types of paint.



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Send me your FREE booklets on Oakite Compounds Nos. 31 and 33. I am especially interested in removing the following soils from ( ) steel, ( ) cast iron, ( ) sheet aluminum, ( ) aluminum castings:

☐ Oil and grease
☐ Drawing compounds
☐ Rust preventives
☐ Identification inks
☐ Carbon smut
☐ Paint
☐ Rust
☐ Heat scale
☐ Tarnish
☐ Welding flux
☐ Soldering flux
☐ _____

NAME _____
COMPANY _____
ADDRESS _____

Materials Roundup

Aluminum:

Report new machine stock has improved properties.

An unusual method of production has resulted in development of a "deep-drawn" aluminum machine stock with improved physical and mechanical properties and superior machining properties, G. A. Moudry, chief metallurgist of Harvey Aluminum, Torrance, Calif., recently reported.

Refined machining properties of the new material are attributed to the method by which the metal is worked. Deep drawing the material under high pressure changes the metallurgical structure of the aluminum rod or bar.

The resulting change in macrostructure of the metal is responsible to a large degree for the improved machinability characteristics, it is claimed.

Die Steel:

Air hardening material used successfully in mill guides.

On the basis of results over a two-year period, an air-hardening hot-work die steel can be used to advantage in hot work mill guide applications, steel company engineers report.

Increased production and improved quality of product more than offset higher initial cost in comparison with cast iron and cast steel in the same applications, according to Jessop Steel Co.

First mill guide application of the die steel was on an 18-in. billet mill in the plant of a large bar producer. The guide was in use over a month before replacement was necessary. Later installations produced equally good results, according to Jessop.

FOR MORE DATA ON MATERIALS

More information on any item reported in this section may be obtained by using the reply card on page 128. Indicate the page on which the item appears and note exactly the information wanted.

Porcelain Enamel:

Titanium frit designed for new colored home appliances.

A new titanium frit for porcelain enamel, developed specifically to meet the needs of the appliance industry in the manufacture of colored home appliances, is now being produced by Ferro Corp., Cleveland. The new titanium enamel is reported to provide true color values, and strong resistance to fading or to color variance.

Developed particularly for the exacting color requirements of the home appliance industry, this new "1700" frit is produced using a "flake" process.

The new color frit compares favorably in adhesion and thermal properties with white titanium porcelain enamels, and produces the same high gloss finish free from roughness and surface imperfections, engineers of Ferro Corp. report.

More On Materials

Development of new materials and the unusual application of both new and standard materials is reported each week in the news and technical pages of THE IRON AGE. Here are a few of the articles of interest reported during June:

Wide Choice In Coiled Strip Leads to Faster Fabrication, June 3, p. 124 and June 10, p. 118.

Show Stars New Materials for Industry, June 3, p. 128.

Plastics: Headed for Best Year Ever, June 17, p. 101.

To everyone this is a sign of peace

And to smart gear users this CINTI is a sign of *good* gears.

CINTI "Gears... Good Gears Only"

THE CINCINNATI GEAR CO. • CINCINNATI 27, OHIO

For Profitable Design

Adhesives:

New bonding materials have high strength, flexibility.

Industry's trend toward wider use of improved bonding materials to assembly operations has called for, and been made possible by, bonding agents with greater strength and flexibility.

Two new adhesives for bonding metal-to-metal and metal-to-plastic—one offering high strengths at normal temperatures, and another offering flexibility at elevated temperatures, have been developed by Rubber and Asbestos Corp., Bloomfield, N. J.

High Shear Strength

Originally developed for aircraft structural applications, these new formulations appear to offer widespread applicability to regular civilian industrial production needs.

One formulation, Bondmaster M615, for normal temperature use, is said to yield shear strengths (under the Air Force Tensile Shear Method) of up to 3500 psi. Accompanying peel strength (NEMA method) of up to 19 lb, and excellent impact strength, is claimed.

The second formulation, M616, is claimed to provide shear strengths up to 3000 psi at 180°F, while maintaining exceptional flexibility.

Bond holds at 1500 psi . . .

need a finish
that blocks corrosion by itself—or under paint? *specify* **IRIDITE**

You can solve any problem of non-ferrous finishing . . . maximum corrosion protection . . . sparkling clear or colored decorative finishes, firm and lasting base for paint . . . with these two words—"specify Iridite". For example—

- **ON ZINC AND CADMIUM** you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.
- **ON COPPER . . .** Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.
- **ON ALUMINUM** Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.
- **ON MAGNESIUM** Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

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INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

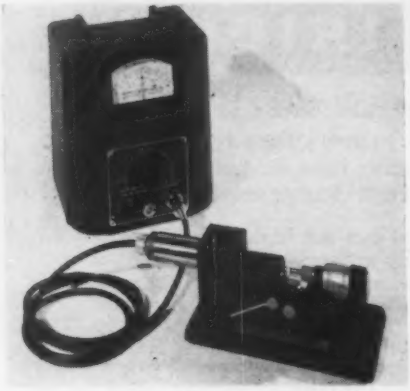
NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 127 or 128.

New process for producing splines, oil grooves

Rolling splines or similar shapes on external parts by a basic new process is possible on new Roto-Flo machines. It is a cold working process in which the metal shaft is placed between the forming racks and emerges in a few seconds with the teeth completely formed at any desired position along the shaft. The resulting splines have a high degree of accuracy and excellent surface finish. Parts are usually made to the pitch diameter before forming. Their increased load capacity allows use of the finer splines for the same jobs done by coarser splines. *Michigan Tool Co.*

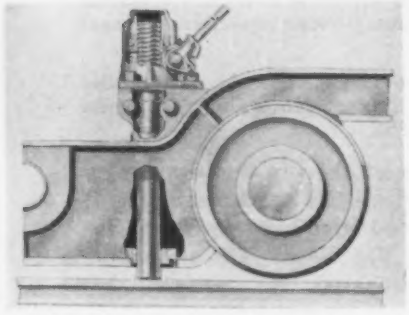
For more data circle No. 25 on postcard, p. 127.



Electronic micrometer reads to 0.00001 in.

Combination of B&S standard precision tools forms an electronic micrometer that measures small parts to 0.00001 in. at magnification of 18,000X. This magnification is continuously variable from 1800X to 18,000X. A standard electronic amplifier and gage head cartridge are combined with a standard indicating bench micrometer. A frictionless member supported by parallel reeds transmits motion from anvil to the gage head cartridge, and the micrometer head is set to the required 0.0001 in. An easily operated retracting lever provides for rapid placing of work between measuring points. The part itself rests on a small adjustable table. The instrument meaures fine magnet wire, small screw machine parts, pivots, etc. *Brown & Sharpe Mfg. Co.*

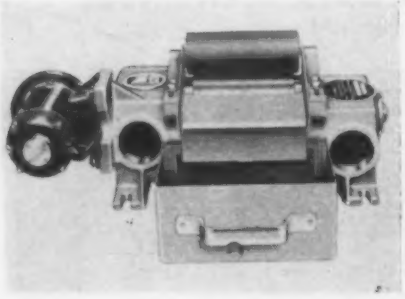
For more data circle No. 26 on postcard, p. 127.



New jack application ends service headaches

Lifting overhead crane trucks for servicing is being made easier by a heat-resistant worm gear jack with a sealed-in grease packed housing. It can be installed as a permanent part of the crane after a few slight modifications to the crane's structural sections. When installed, the 25-ton capacity worm gear jack can be used to lift cranes for such repair jobs as replacing bearings, bushings and wheels and general lubrication. The worm gear jack is ratchet operated. Housing is packed in grease and sealed; heat and dirt will not affect the operation of the jack. Built to fill exact customer specifications. *Duff-Norton Mfg. Co.*

For more data circle No. 27 on postcard, p. 127.



Separator cleans liquid coolants automatically

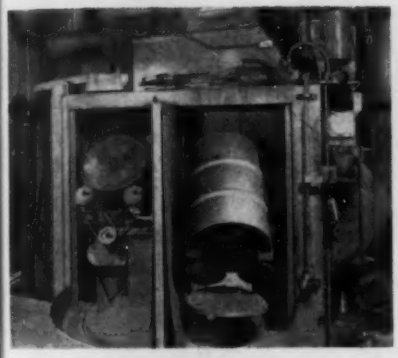
New Houdaille magnetic separator automatically filters out ferrous metallic particles from coolants and cutting oils. The small, compact unit operates continuously to provide a constant supply of clean coolant for all types of machine tools. Separator can be installed on the machine tool sump. Contaminants are removed by means of permanent ring magnets completely enclosed in a revolving cylinder. Construction assures 360° of constant magnetic attraction. Available in 10 and 20 gpm for soluble oils; 5 and 10 gpm for mineral oils. *Honan-Crane Corp.*

For more data circle No. 28 on postcard, p. 127.

Wide work range features chamfering machine

Two-station universal gear deburring and chamfering machine is designed to handle all spur and helical gears, and straight and involute external splines from 5/8 to 6½ in. pitch diameter. Essentially a high production machine, its versatility and quick changeover make it readily adaptable to moderate length or short run production. The two stations can be tooled to perform identical operations; successive steps on the same gear; or deburring and chamfering parts that are totally different. Once started, the machine operates continuously, chamfering the entire tooth form, both sides of the tooth and root, in 1/5 second. Operating cycle is so simple that an inexperienced operator can realize maximum production. *Modern Industrial Engineering Co.*

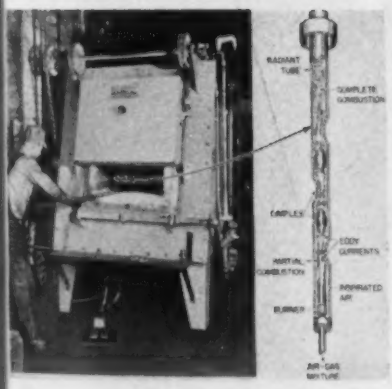
For more data circle No. 29 on postcard, p. 127.



Blasting machine cleans steel drums

An airless abrasive blasting machine for the reconditioning cleaning of 30- and 55-gal steel drums before painting and coating operations is capable of cleaning the exterior surfaces of closed-end drums and both the exterior and interior surfaces of open-end drums, together with the lids. A hydraulically-rotated table with a partition divides the machine into two compartments or work stations. Each work station has two power driven spinner shafts that rotate one drum in the blast zone. A fixture holds the lids. Cleaning is done by abrasive hurled centrifugally by a rotating bladed wheel. *American Wheelabrator & Equipment Corp.*

For more data circle No. 30 on postcard, p. 127.



Radiant tubes applied to toolroom furnaces

Large scale application of radiant tubes to toolroom-size furnaces is found in a new gas-fired radiant tube atmosphere furnace. The unit is suited for heat treating virtually all production and tool steels, except high-speed. New design of the radiant tubes makes it possible to suspend them along the sides of the furnace chamber. Made of thin walled tubing and Inconel, they give maximum heat transfer rate through the tube wall and minimum internal tube temperature for long life. Furnace shell is heavy steel plate reinforced; is continuously welded to be gas tight. Automatic gas-air curtain fully covers vestibule when the door is opened. Furnace doors are vertical lift type. Maximum operating temperature is to 1850°F. *Lindberg Engineering Co.*

For more data circle No. 31 on postcard, p. 127.

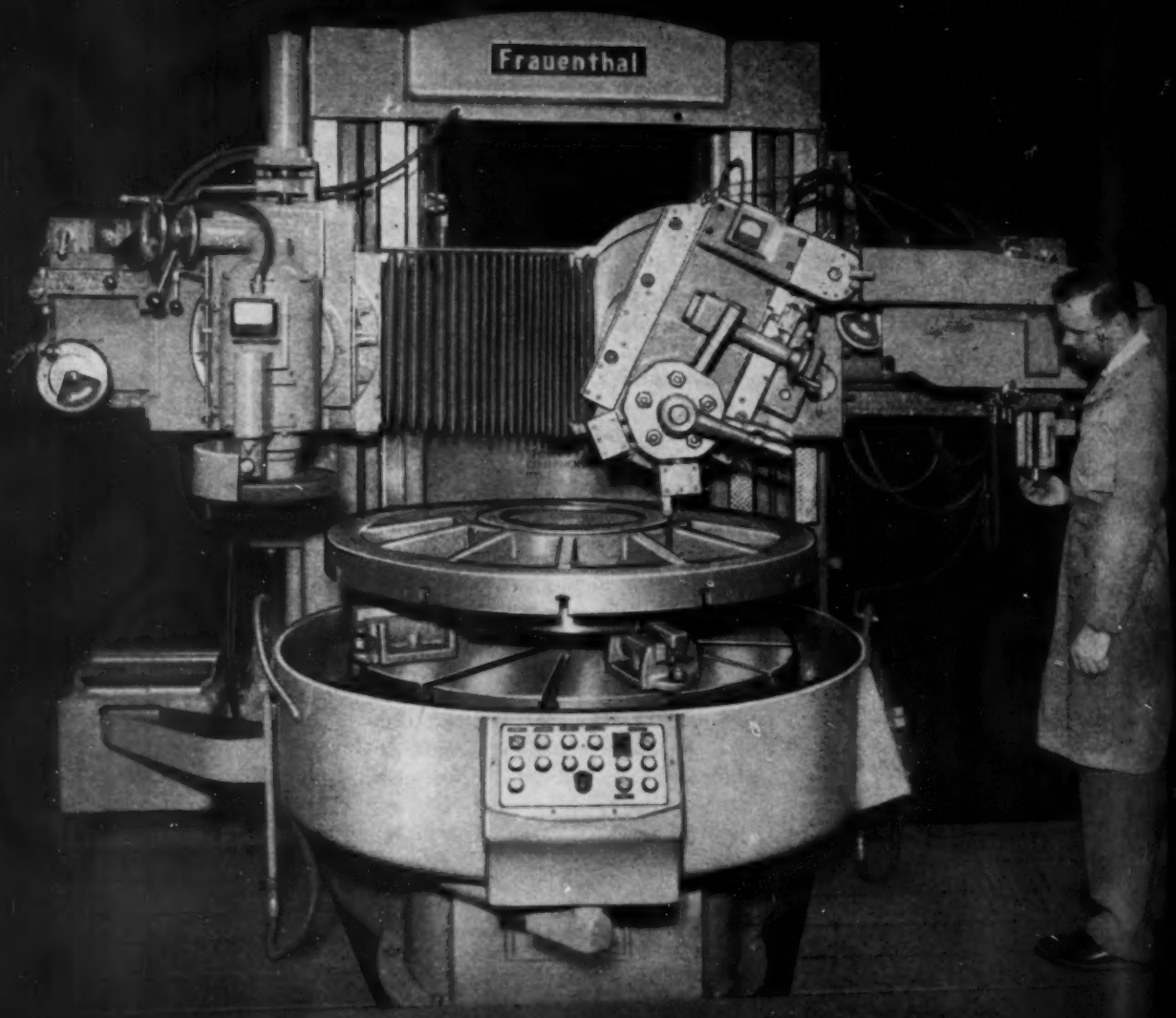
Mold handling conveyor capable of smooth travel

Smooth motion in handling molds up and down inclined planes and on the level is claimed for a new universal mold conveyor. Featuring articulated connections between the cars and internal type takeups, the conveyor requires no lubrication. It is equipped with permanently lubricated ball bearings and oil impregnated bushings. Cars are made up of rugged malleable iron chassis, chilled iron, flangeless wheels, and easily changed tops that can be steel or cast iron, roller or hinged for automatic discharge. All moving parts below the car tops are fully protected from sand, shot or runouts by specially designed shields. A quiet, powerful crawl-drive unit moves the conveyor at desired speeds. *Jeffrey Mfg. Co.*

For more data circle No. 32 on postcard, p. 127.

Turn to Page 138

announcing..



Frauenthal Division • THE KAYDON

The Frauenthal Series 3100 precision turning and grinding machine

NOW AVAILABLE FOR THE FIRST TIME — here's a machine specifically designed to perform finish turning and ultra-precision grinding operations. With it, you can produce accuracies previously considered impractical, with assured concentricity of related surfaces finished on a one-setup basis!

Originally designed to meet the exacting requirements of jet engine production, the Series 3100 machine is completely new from the ground up. Its unique design opens up new possibilities for machining large work-piece, close-tolerance jobs on a mass-production basis. The Series 3100 offers the entire metal-working industry exceptional new capacity for precision turning and precision grinding.

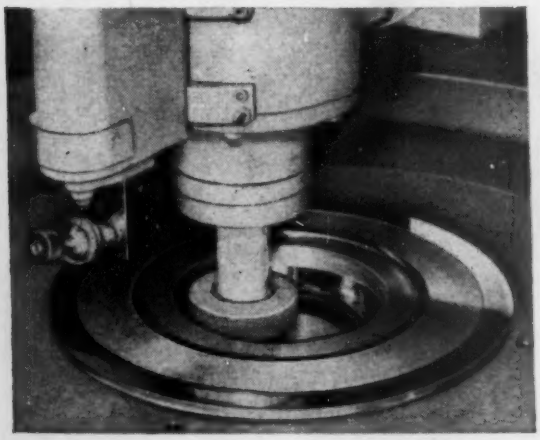
CHECK THESE IMPORTANT FEATURES

- Ultra-precision work-table bearings
- Hydraulically actuated turning slide
- Hydraulically actuated grinding slide
- Hydraulic grinding spindle
- Conveniently located controls and safety switches

. . . AND THIS OPTIONAL EQUIPMENT

- Hydraulic tracer control
- Electronic surface speed control
- Hydraulic wheel dressers for varied applications

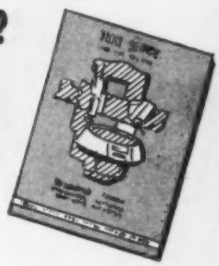
Here, the operator uses a Series 3100 machine to bore out the inside diameter.



This closeup shows how the machine performs close-tolerance finish grinding of the workpiece's top surfaces and inside diameter.

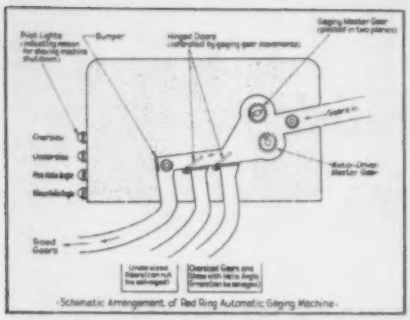
May we help you?

If you'd like to have details on how the Series 3100 can offer you new tool room or production benefits — our engineers are at your service. Write for informative bulletin No. 301.



Frauenthal MULTIPLE-HEAD • SUPER-PRECISION • VERTICAL **Grinders**

ENGINEERING CORP. • Muskegon, Michigan



Schematic Arrangement of Red Ring Automatic Gaging Machine

Motorized machine inspects and sorts gears

Fully automatic gear gaging and sorting machine makes up to four checks on gears for both size and helix angle accuracy. The machine may be adapted to check size only before shaving operations, or a combination size and helix angle check after shaving. Built-in controls shut off the shaving machine after a predetermined number of reject gears are produced. Good, undersized, oversized gears are directed through chutes in the base of machine. Gear feeding through the machine can correspond to production rates of rotary shaving machines. *National Broach & Machine Co.*

For more data circle No. 33 on postcard, p. 127.

Lever punch and shear is versatile for multi-jobs

With a 5-ton capacity and 24-in. throat, this new punch and shear is well-suited to the needs of industrial sheet metal shops, maintenance departments, experimental and model shops. Accurate, smooth shearing in straight lines or intricate shapes as well as numerous types of punching and notching are possible. The machine shears from front to back or left to right and slits sheets of infinite length up to 48 in. wide, down the center. It is equipped as a punch or shear or both and is readily converted from one to the other. *Niagara Machine & Tool Works.*

For more data circle No. 34 on postcard, p. 127.

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IngAclad
STAINLESS-CLAD STEEL

Heat-Resisting Steel
of Exceptional Forming Qualities

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Sheets and Plates

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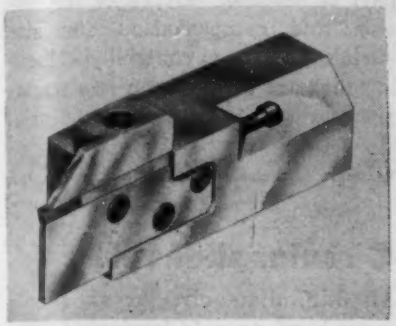
Ingersoll ENGINEERING B-W PRODUCTION **STEEL DIVISION** ***Borg-Warner Corporation***

310 S. Michigan Ave., Chicago 4, Illinois • *Plant: New Castle, Indiana*

Cut-off tool

Faster, more economical carbide cutting is claimed for a new clamp-on tool for cut-off work. A V-blade support assures accurate location of the carbide cutting insert. Cutting insert is always on

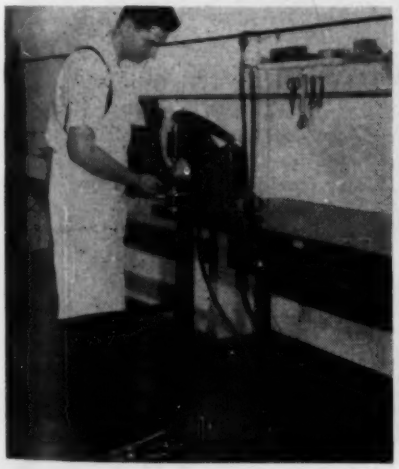


center and will not lead-off during cutting. In addition to providing longer tool life under heavier feeds and faster sfm, the tool features a fast 15 sec insert change. Tool body need never be moved in the setup to replace a dull cutting insert. *Portage Double Quick Tool Co.*

For more data circle No. 35 on postcard, p. 127.

Bench riveter

New air-powered, bench-model riveter will clinch up to ¼ in. tubular steel rivets. A rugged air cylinder delivers over 2 tons pressure, taking a maximum of 150 psi from normal air supply lines.



With a full 1 in. stroke, the machine may also be used for stapling, light punching, knocking out rivets, etc. The riveter is foot operated with metering type treadle valve giving positive control of the action. *Robinson Products, Inc.*

For more data circle No. 36 on postcard, p. 127.

Turn Page

for cutting cost corners . . .

NORTHERN CRANES

The present necessity of cutting costs and increasing production requires the most effective use of tooling and equipment. Maintaining your competitive position may be resolved by your ability to cut every possible cost corner in your processing.

A NORTHERN CRANE—in capacities up to 150 tons, and of any desired span — provides safer, faster, more dependable heavy load handling than was adequate when production schedules were lower, or when the high cost of delays was not as critical as today. You can cut many cost corners with NORTHERN CRANES.

Bulletin SE-108-A (up to 150 tons) or, Bulletin HL-115-R (up to 20 tons) will be sent at your request.

NORTHERN CRANES • HOISTS • TRAVELATORS

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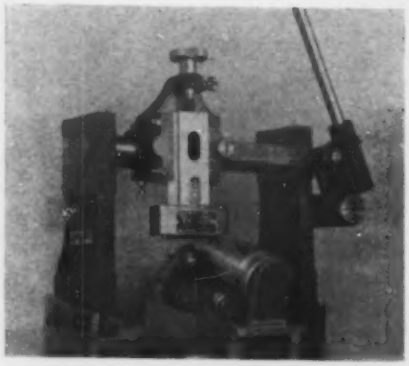
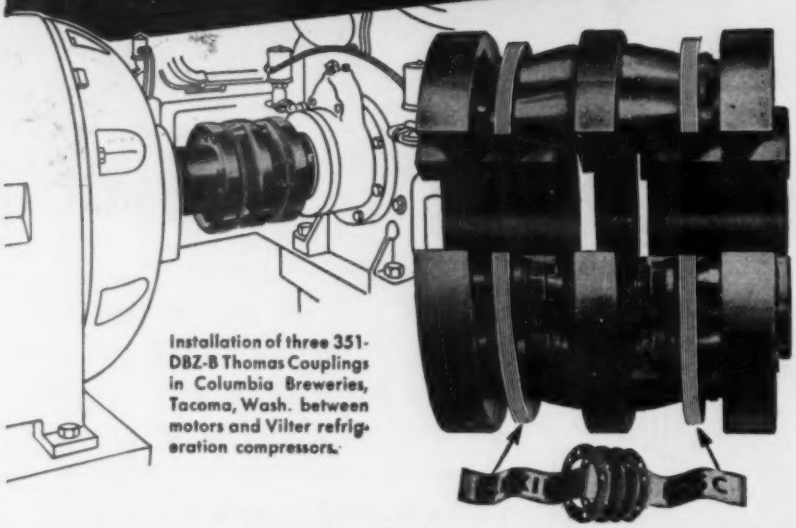


Centerless marking device for brand labeling

Precision calibration, marking, and brand labeling of manual dials, shells, gas bottles, tapered cylinders, and similar products are simplified with a new centerless marking device called the Micro-Marker. It fits any standard marking press utilizing the draw bar principle. And it features a ball-bearing cradle on which the part rotates, making it suitable for marking parts when stress and plastic flow must be minimized. A mark as slight as 0.003 in. will register, completely around the part if desired. Depth of impression and compensation for size variations can be controlled. Marking dies are available in two standard forms. *Acme Marking Equipment Co.*

For more data circle No. 37 on postcard, p. 127.

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

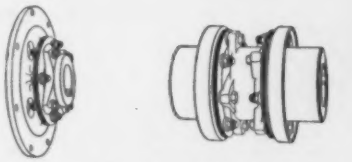


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.

Write for our new Engineering Catalog No. 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

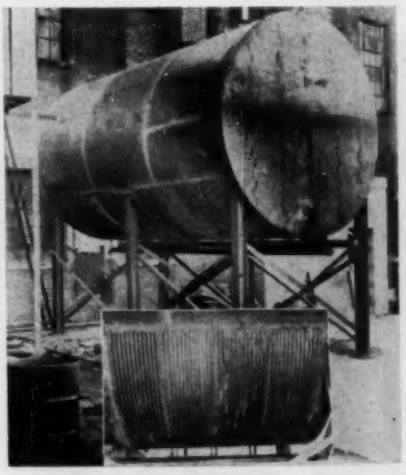
Circular slide rule

An 8-in. diam circular slide rule is made of durable laminated plastic. The instrument is equivalent to a straight type slide rule over 20 in. long. Useful to anyone having to work with figures. Complete instructions are permanently printed on the reverse side. *Allegheny Plastics, Inc.*

For more data circle No. 38 on postcard, p. 127.

Tank heating

Instead of pipe coils within the tank, Thermo-Panels have been structurally built into the walls of this tank, said to be a better method for heating and ease in

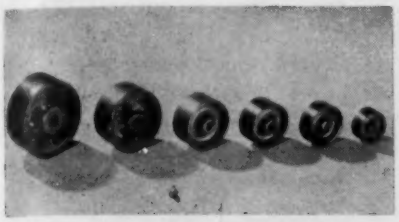


cleaning out the tank. Thermo-Panels are available also in flat plates and in special shapes such as U's and L's, and cylinders, in a wide range of materials, including steel, stainless steel, Monel and other special alloys. *Dean Products, Inc.*

For more data circle No. 39 on postcard, p. 127.

Custom made parts

Sintered metal parts, rollers and wheels are offered to industry. Iron base and brass rollers and wheels can be made as large as 3 in. diam x 2 in. hub length, with

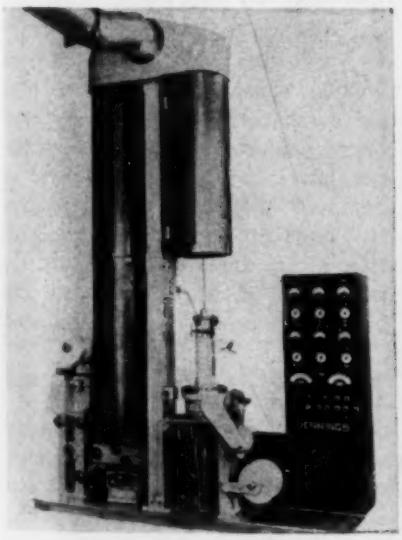


bore sizes to suit. The finished parts are precise and have mechanical strength and physical properties comparable to those of machine parts, it is stated. *Bassick Co.*

For more data circle No. 40 on postcard, p. 127.

Coated wire

Packaged machine puts Teflon on wire. Called the TE-1 Teflon wire insulating extruder, the unit requires only one operator, operates by pushbutton control. The extruder runs bare wire from a spool through an extruder unit assembly



where paste Teflon is applied to the wire. A vaporizing oven then extracts the extrusion aid from the Teflon and the wire passes through sintering ovens where the resin is cooked to the wire. The coated wire is then rewound on a takeup reel. *Jennings Engineering, Inc.*

For more data circle No. 41 on postcard, p. 127.

Turn Page

the multi-purpose lifting machine for the small shop

STUEBING DESIGNED • STUEBING ENGINEERED • STUEBING BUILT

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Hydrolift Straddle Stacker

here are the FEATURES you want most in a mobile stacker

- Capacities to 2000 lbs.
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- 4-wheel stability.
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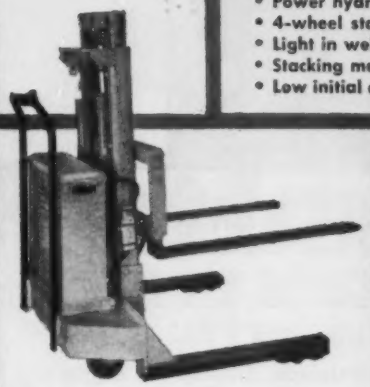
- Low initial cost and upkeep.



The Hydrolift fulfills the demand for an all-purpose hand truck in the average plant. It can be used for handling pallets, skids, dies, drums, barrels, sacked goods, and for numerous other non-routine jobs.

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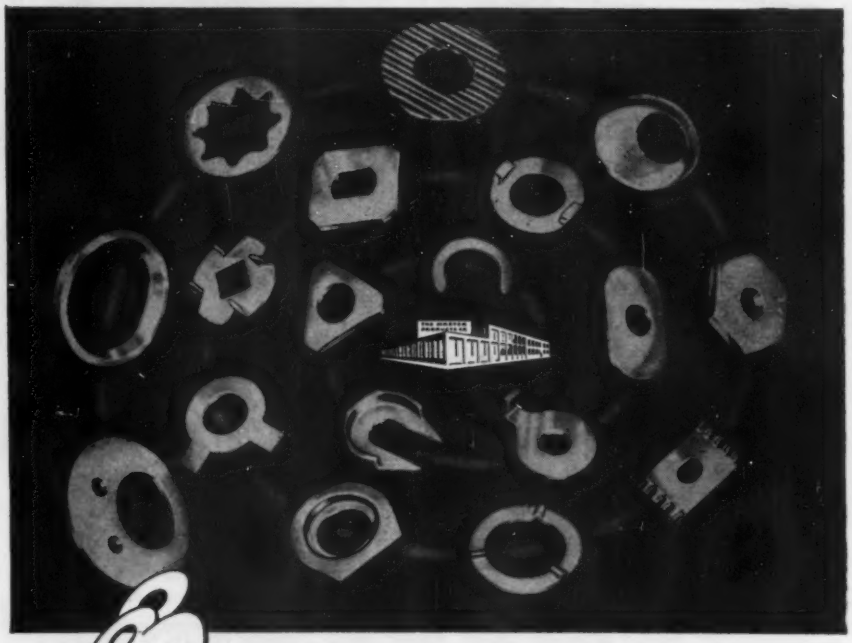

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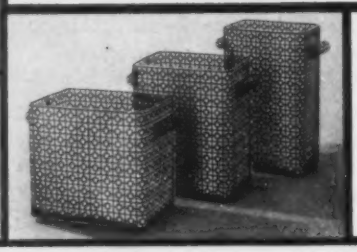

Distributed by Sun Glo Studios, New York, N. Y.

With today's trend toward modern styling, Hendrick is becoming more and more important to fabricators of metal products. Typical of these is the Ideal Mfg. Co. of Oskaloosa, Iowa, who manufactures the attractive home furnishing items shown above using Hendrick's Perforated Metal Square Link design.

And this is only one of hundreds of designs Hendrick can supply in commercially rolled metals and gauges with round, square, diamond, hexagonal or slotted perforations. If you would like further information, write Hendrick today.

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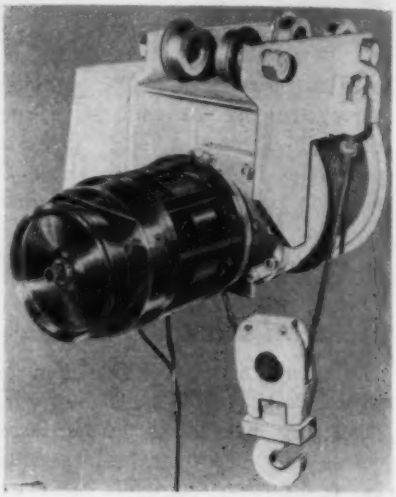
Electric hoists

New line of electric hoists for overhead materials handling will have capacities ranging upward from 4 tons, with special attention given to applications requiring lifts of over 15 tons. The line will feature ac electric motors and gear reduction units developed by LeTourneau for use on their heavy electrically



powered and controlled equipment. Standard models of 4, 5, and 6-ton now offered have wire rope lift, with swivel hook suspended on a two-part line. Hoists are all-steel welded construction with electrical components protected for outdoor, year-round operation. Suspension is by lug, hook, plain or geared trolley. Positive load control down to increments of a fraction of an inch is offered by the new line. *R. G. LeTourneau, Inc.*

For more data circle No. 42 on postcard, p. 127.

Motor overhaul

Small, ball-shaped pellets when inserted into the spark-plug openings of a motor are said to create a factory-smooth, metallic layer over pitted, scored, and worn areas of pistons, rings, and cylinder walls, restoring them to original size, shape and effectiveness. The new product, known as Engine-Overhaul, is a simple, inexpensive, do-it-yourself method of correcting automobile cylinder and ring troubles without taking the motor apart. *Yale Engineering Co.*

For more data circle No. 43 on postcard, p. 127.

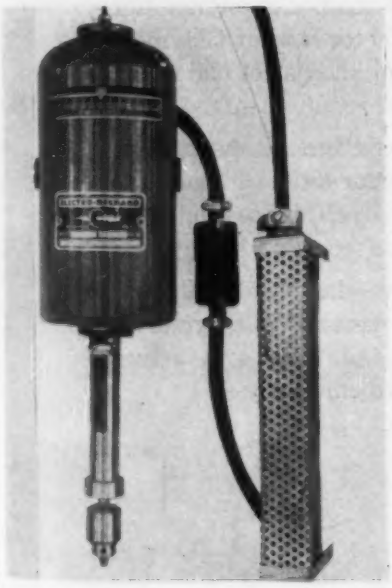
Four-way valve

New hand-and-foot operated four-way valve has built-in, full capacity flow-control meters of the Venturi type. An air and low-pressure hydraulic valve, it is specifically designed for the control of double acting air or hydraulic cylinders. The valves are ruggedly built for heavy duty service and long operating life; feature one balanced spool using renewable O ring type packing. Flow control meters permit full-line volume without loss of pressure. Non-corrosive throughout, the compact valve is offered in four standard pipe sizes—¼, ⅜, ½ and ¾ in. *Airmatic Valve, Inc.*

For more data circle No. 44 on postcard, p. 127.

Drilling spindle

A high speed spindle unit complete with self-contained motor is used in special drilling, reaming, and grinding machines that have their own feed mechanisms. Speed ranges of 1000 to 10,000 rpm or 2500 to



15,000 rpm are available. An electric governor keeps the spindle speed constant whether idling or drilling. Precision tolerances are held throughout. The unit can be mounted in any position. Several drill heads can be mounted on one base for sequence of operations. *Electro-Mechano Co.*

For more data circle No. 45 on postcard, p. 127.

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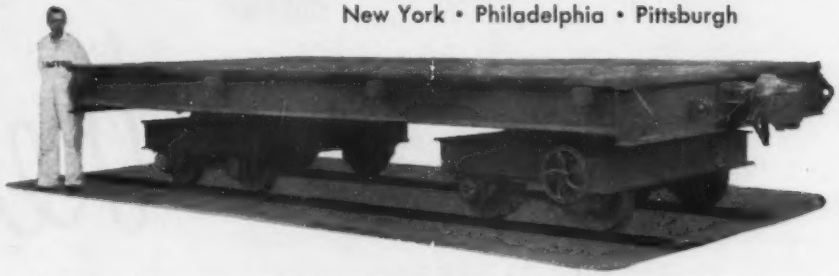

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THE IRON AGE SUMMARY . . .

- Steel prices will rise average of $3 to $4 a ton
- Wildcat strike helps push ingot rate off 5 points
- July vacations may strengthen market in August

Prices . . . Steel prices will be advanced by an average of $3 to $4 a ton hot on the heels of a wage-pension-insurance package that will cost steel companies 10¢ to 12¢ an hour. The award to the union, which includes about 5¢ for wages, is substantially as reported previously on this page. (For more details see p. 69.)

Since the wage cost will apply from July 1, it's a safe bet that steel prices will start to go up within a week.

Full impact of the increase that averted a strike at midnight June 30 is still to be studied. Not all steel prices have identical labor costs. Some will therefore be raised by less than the $3 to $4 a ton average. Some will top the average.

Among steel company officials questioned by THE IRON AGE this week there was no doubt about the need for a price increase. Typical comment: "We might have squeezed through for a while on our original offer without a price boost. But it's absurd to think we or anybody else can absorb anything like 12¢ an hour."

Steel officials know that their customers are worried about higher costs. These customers have been saying so for the past few weeks. But steel people are a lot more conscious of the need for a decent profit margin now than they were in the prewar price-cutting days. One reason: merely to replace present plant and equipment as it wears out will cost them $1 billion a year at current prices. And this allows nothing for expansion of present capacity.

Significance . . . Lack of pre-strike jitters gave many the impression that a strike threat didn't really exist—some thought there had been a "deal." The fact that furnaces weren't banked on Monday—with only 2 days to go to the strike deadline—was misleading. Fact is that practice has cut furnace banking time from 3 to 4 days to something less than 2 days. But there was no deal: The threat was there. The simple truth is that the business upturn strengthened labor's hand, gave management reasonable assurance of being able to pass on part of higher cost.

Production . . . A wildcat strike at a midwestern mill combined with general strike precautions in a few quarters to knock 5 points off this week's steelmaking schedule.

Outlook . . . There is a distinct possibility that concentration of plant vacations in July could add stimulus to steel business in August. Indications are that many of these steel users had pretty well whittled down their inventories by June. Possibility of a steel strike didn't bother them until then, by which time it was too late to place mill orders.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	1,597	1,720	1,674	2,069
Ingot Index (1947–49=100)	99.4	107.1	104.2	128.8
Operating Rates				
Chicago	79.0	83.5	83.0	102.5
Pittsburgh	69.0	75.0*	68.0	93.0
Philadelphia	57.0	58.0	59.0	96.0
Valley	64.0	67.0*	70.0	96.0
West	78.0	84.0	75.0	101.5
Detroit	36.0	59.0*	83.0	105.0
Buffalo	67.5	67.5	67.5	106.5
Cleveland	65.5	65.0*	66.0	88.5
Birmingham	76.0	76.0	71.0	99.5
S. Ohio River	82.5	81.5	82.5	89.5
Wheeling	95.0	93.0	76.0	100.0
St. Louis	65.5	73.0	64.5	107.5
East	50.0	60.0*	63.0	86.5
Aggregate	67.5	72.5	70.5	92.0

* Revised. † Tentative

Prices At A Glance

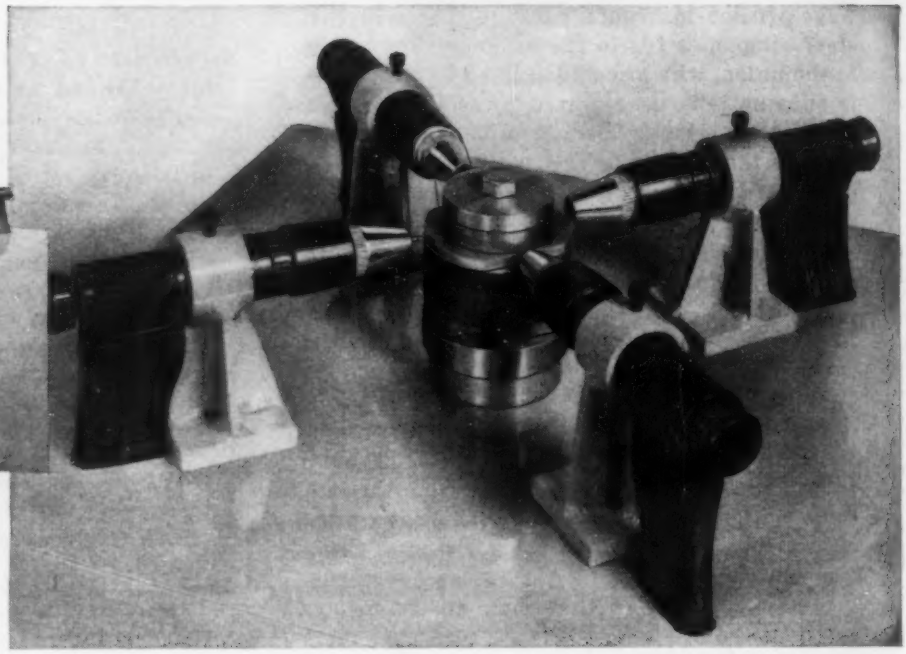
(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.634	4.634	4.634	4.634
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$56.01
Scrap, No 1 hvy (gross ton)	$26.92	$27.58	$28.58	$43.50
Nonferrous				
Aluminum, ingot	21.50	21.50	21.50	20.50
Copper, electrolytic	30.00	30.00	30.00	29.875
Lead, St. Louis	13.80	13.80	13.80	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	95.875	94.125	93.75	90.50
Zinc, E. St. Louis	11.00	11.00	10.50	11.00

SAVE 50%

INCREASE PRODUCTION

with HELIARC TRADE-MARK Welding



This unit is equipped with a water cooled, high speed HELIARC HW-13 torch—ideal for machine welding.

Stator packs, thin sheet steel stampings joined together, form the laminated enclosure around the armature in electric motors. These parts have been riveted, bolted, and even welded together in the past... But now using HELIARC welding, they are produced faster and more economically than ever before.

Costs ½ a cent or less to HELIARC weld a stator which previously cost manufacturers one cent to rivet.

Maximum electrical efficiency is obtained with HELIARC welded stators—a quality difficult to obtain from riveted or bolted stators.

Welding speeds up to 60 in. per minute are now possible. HELIARC torches in a mechanized setup weld a complete stator pack in a matter of seconds.

HELIARC, sigma, and UNIONMELT welding processes —brought to industry by LINDE's service engineers, form a top notch fabricating team in operations for small shops or huge production lines. From carbon steel to complex alloys, whatever your welding needs are, your local LINDE representative will be glad to help you determine the most efficient, economical welding process for that work. Call him today for more information.

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Outlook Slow for Next 30 Days

Strike-hedge buying had no widespread effects . . . Most saw peaceful settlement . . . Great Lakes strike hasn't created inventory hardships . . . Revise galvanized pipe formula.

Last-minute strike hedging created a slight stir in the market last week and early this week but for the most part consumers had guessed right that steel labor negotiations would be settled peacefully.

July vacation shut downs appear to be more widespread this year than at any time in the past, according to reports received from district offices of steel producers. As a result, the outlook over the next 30 days is pretty dismal. August is not expected to be much better.

The wildcat strike at Great Lakes Steel Corp. brought no influx of business to other producers, probably because automotive steel inventories are ample and the likelihood that the walkout would be over quickly.

To producers of oil country goods it looked as though the market will be strong for balance of the year. The oil fields are going full blast. Drillings for the year are expected to total between 47,000 and 48,000 wells, slightly better than for 1953, itself a good year.

Producers of galvanized pipe have revised their formula for adjusting discounts based on fluctuations in price of zinc. They have switched from 1¢ to 2¢ increments, and discounts change when zinc price falls within stipulated 2¢ ranges.

SHEETS AND STRIP . . . Automotive consumers give no sign of snapping out of their lethargy. As a result, the market continues dull, is slightly weaker if anything. Some consumers in the **Chicago** area were pressing for delivery before labor contract deadline. This was true also in other producing centers but the total effect was not important. **Chicago** looks for a moderate slump in July but mill bookings are much better than expected. **New York** market is spotty. **Pittsburgh** generally is dull, but one producer reported a good order book due to concentrated selling effort. Galvanized is strong.

Purchasing Agent's Checklist

STEEL: Settlement to up prices $3 to $4 .....pp. 69, 145

TRADING: Continue planning scrap exchange .....p. 75

FOUNDRIES: See business on the way up .....p. 63

PRICES: Senate battles over delivered prices .....p. 87

STEEL: Republic extends delivered price system .....p. 76

BARS . . . **Cleveland** finds some encouragement in slight improvement of orders from month-to-month but the net result is not substantial; some producers note modest improvement in June volume over May. In the **East**, a depressed scrap market has become a factor in the price structure of reinforcing bars; some rerolled rails are being sold for reinforcing bar applications, softening prices despite a steady movement of this product. **Pittsburgh** sees little change in demand.

TUBULAR . . . Galvanized pipe producers have revised their formula for adjusting discounts in line with zinc price changes. To minimize fluctuations, the mills switched from 1¢ to 2¢ increments and at the same time doubled the resulting changes in terms of points. For example, with zinc price now at 11¢, discounts are based on an "over 9¢ to 11¢ inclusive" bracket. A rise in price of zinc would throw discounts into an "over 11¢ to 13¢ inclusive" bracket and discounts would drop (higher price) 2 points for ½, ¾ and 1-in.; 1.5 point for 1¼, 1½ and 2-in., and 1 point for 2½ in. and larger. Procedure would be reversed when zinc price drops to within "over 7¢ to 9¢ inclusive" bracket. Demand for oil country goods continued strong.

WIRE . . . **Pittsburgh** reports demand for manufacturers' wire and structural products continuing strong, with merchant wire definitely soft. Demand for merchant wire is strong in **Chicago** district, where some wire products are booked through August and into September on some sizes; welding rod picked up slightly but expected to decline sharply in July. Mesh wire is booming in the **East**, where some producers being urged to expand productive capacity. **Cleveland** says pent up demand for wire fence from agriculture is sustaining market but foreign competition has hurt some producers.

STRUCTURALS . . . Highway, bridge and building construction is spelling out a fair-to-good market. As usual, wide flange beam demand is better than for standard structurals. The **East** looks for sustained demand through the summer. In **Chicago** delivery promises are down to three-to-four weeks compared with six-week schedules earlier.

PLATES . . . Market is spotty. Railroad demand continues slow. In **Chicago**, tank and heavy pipe buying is good; warehouse buying off slightly; short deliveries becoming the rule. Similar reports from the **East**, and **Pittsburgh**.

PIG IRON . . . **Pittsburgh** notes some foundries wanted deliveries before labor contract expiration, but apart from this conditions are strictly competitive; prices are holding but freight absorption is general.

WAREHOUSES . . . Construction on **West Coast** has given warehouse business a shot in the arm; standard structurals, wide flange beams, and some bars and sheet metal are in strongest demand; average order size is down but total tonnage to good. In **Chicago** alloy bar demand is soft and sheets are no better but general tone is as good as last week and in some spots better; June demand will be comparable with March: tool steel market has weakened slightly.

Copper Market Continues Strong

Domestic and export sales maintain good pace . . . July volume high despite vacation shutdowns . . . Scrap export demand slack . . . Lead, zinc slow—*By R. L. Hatschek.*

Copper continues to defy early predictions by maintaining excellent demand. Even sales for July—traditionally slow because of vacations—were higher than anticipated. Only foreign demand for scrap has abated and consumers now report they're getting all they need.

Aluminum is pausing in midstride to eye the steel labor talks, expecting to get almost identical demands from the union as soon as steel talks end. Contracts run out this month and negotiations are merely marking time until a new steel contract is written.

Quiet strength dominates tin as, at presstime, enough signatures had been affixed for ratification of the International Tin Agreement.

COPPER . . . Level of current demand for copper continues to surprise many observers. Chile's surplus stocks have reportedly melted away and in the U. S. custom smelters are hard pressed to fill orders for July delivery. Size of the July orders is another surprise as many consumers will shut down their plants for vacations during the month. Export business is sizeable.

The one easier facet of the market is scrap. Export demand, which recently was quite active, has now just about evaporated and domestic consumers report the volume they're getting is good. But prices haven't softened any.

In Washington the Senate last week passed its version of the copper import tariff suspension. The bill must now be discussed by a joint Senate-House committee to iron out the single difference, whether the suspension is to be for 1 or 2 more years. In all probability, the result will be a 1-year suspension. The bill does carry the stipulation that reimposition of the 2¢ per lb duty is mandatory if the domestic copper price falls below 24¢ per lb.

ALUMINUM . . . All eyes this week were focused on steel industry labor negotiations for an indication of what the union would seek from aluminum producers. As we went to press, the United Steel Workers had not started negotiations in the aluminum industry. But since contracts expire at the end of this month, the talks are expected to get under way as soon as steel talks are concluded.

Marketwise, demand continues at a good pace while supplies are more than adequate. Excess ingot production, of course, is being fed into the national stockpile.

TIN . . . Scoreboard of countries which have signed or intend to sign the International Tin Agreement had reached the point early this week where only one more consuming nation's signature was needed to bring the pact into force.

All producing nations except Thailand are in favor and Thailand said it would sign if certain obstacles could be overcome. The Thai signature is not actually needed for ratification.

On Monday two more consuming nations signed. This brought the total of votes already affixed or indicated to one more than the required nine.

While the pact does not necessarily go into immediate effect, the way the voting has been going has been a strengthening factor in the tin market. New York prices gained steadily last week with each day's change in the upward direction. But fluctuations were slight as traders didn't wish to disturb the market while the agreement was still pending ratification.

NICKEL . . . Despite all the talk about "easier nickel" coming from Washington, consumers would like to be able to get more. True enough, supplies are healthy—but so is the government stockpile take. While defense production is lower than it used to be, the production that continues is heavy on high-temperature alloys for jet planes and guided missiles.

Result is a continuing tight supply despite lighter demand for some civilian products and improving production.

LEAD . . . Activity in lead, following the recent stockpile flurry, has subsided to about what it was before. The market is quiet with buyers not overly anxious. Outlook for July is somewhat better as battery makers will come into the market more heavily in the usual seasonal pattern.

Bureau of Mines reports total lead consumption for the first 4 months of the year was 357,000 tons, off about 8 pct from the corresponding 1953 period. Use for the month of April totaled 93,700 tons as compared to 93,200 tons in March. But consumers' stocks of refined lead climbed from 65,138 tons to 69,386 tons, highest yet this year.

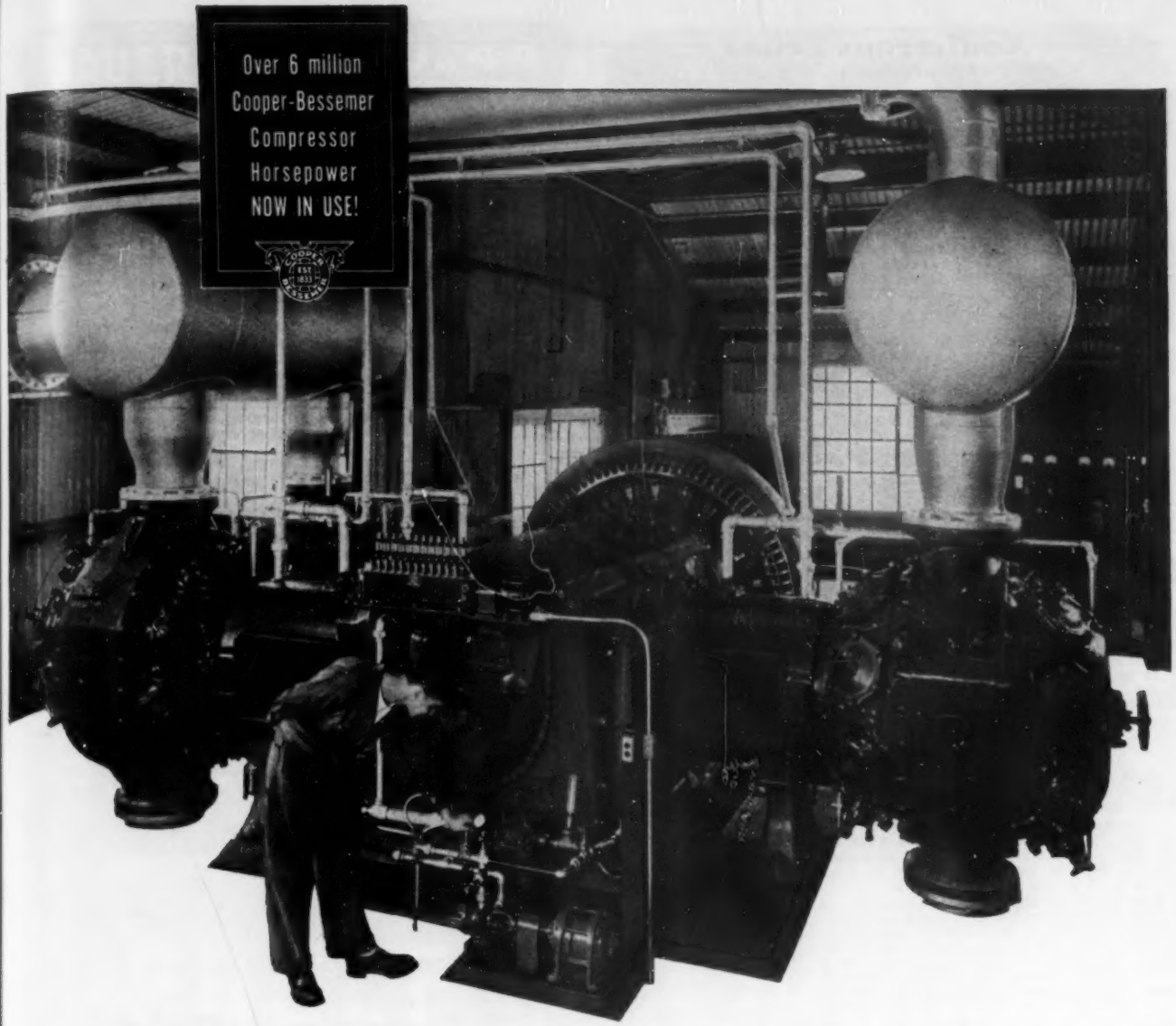
ZINC . . . Oversize smelter stocks still overshadow the zinc market despite better feeling which resulted from renewed government buying. Still another factor holding down zinc has been the steel labor bargaining—nobody wanted a lot of zinc if galvanizing lines were to be strikebound.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	June 23	June 24	June 25	June 26	June 28	June 29
Copper, electro, Conn.	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake, delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	94.625	94.75	95.00	....	95.875	95.875*
Zinc, East St. Louis	11.00	11.00	11.00	11.00	11.00	11.00
Lead, St. Louis	13.80	13.80	13.80	13.80	13.80	13.80

Note: Quotations are going prices
*Tentative



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AT Chas. Pfizer & Co., Inc., Vigo plant in Terre Haute, antibiotic processing is a *continuous* operation, requiring lots of air. And since air failure would be disastrous, it was essential to have the most reliable compressor obtainable. The Cooper-Bessemer unit shown above was installed over a year ago; has been in virtually constant 24-hour-a-day operation ever since.

There's all kinds of proof that you can't top a Cooper-Bessemer compressor for reliability. What's more, its modern, compact design, with vibration-free opposed action, means smoothest operation, simplified maintenance, and substantial savings in space and foundation requirements.

Send for the latest bulletin, shown here, or check with the nearest Cooper-Bessemer office on the money-saving unit just right for your needs.

SEND FOR YOUR COPY

Covers Cooper-Bessemer Type M compressors, 200 to 1000 hp. Other bulletins covering still larger size units are also yours for the asking.

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Nonferrous Prices

(Effective June 29, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136 in. and thicker, 2S, 3S, 32.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢; 0.081-in., 2S, 3S, 35.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢; 0.032-in., 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, ¼-in., and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.5¢ to 82.8¢; 12 to 14, 37.2¢ to 99.0¢; 24 to 26, 39.9¢ to $1.29; 36 to 38, 47.2¢ to $1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.449-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32-in., 69.6¢ to 47.0¢; ⅜ to 1½-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2-in., 31.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 38.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60 in., $2.838; x 96 in., $4.543; x 120 in., $5.680; x 144 in., $6.816. Coiled sheet, per lb, 0.019 in. x 28 in., 30.8¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 57¢; ⅛ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅜ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $11; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless tube	115½	100½	137½
Shot, blocks	....	60	....

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	....	48.48
Copper, h-r	48.38	44.73	....
Copper, drawn	....	45.98	....
Low brass	44.47	44.41	....
Yellow brass	41.72	41.66	....
Red brass	45.44	45.38	....
Naval brass	45.76	40.07	....
Leaded brass	....	....	39.11
Com. bronze	46.95	46.89	....
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	....
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36	....	62.63

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.
Strip $1.68
Rod, bar, wire 1.65

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 21.50
Aluminum pig 20.00
Antimony, American, Laredo, Tex. .. 28.50
Beryllium copper, per lb conta'd be. $40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $72.75
Bismuth, ton lots $2.25
Cadmium, del'd $1.70
Cobalt, 97-99% (per lb) ....$2.60 to $2.67
Copper, electro, Conn. Valley 30.00
Copper, Lake, delivered 30.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.8%, dollars per troy oz. .. $2.25
Iridium, dollars per troy oz. ..$165 to $175
Lead, St. Louis 13.80
Lead, New York 14.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig 27.00
ingot 27.75
Magnesium, sticks, 100 to 500 lb, 46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $275 to $280
Nickel electro, f.o.b. N. Y. warehouse 63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel 56.25
Palladium, dollars per troy oz. $21.00
Platinum, dollars per troy oz. ..$84 to $87
Silver, New York, cents per troy oz. 85.25
Tin, New York 95.875
Titanium, sponge, grade A-1 ..... $4.72
Zinc, East St. Louis 11.00
Zinc, New York 11.50
Zirconium copper, 50 pct $6 20

REMELTED METALS

Brass Ingot

(Cents per lb delivered carloads)

85-5-5-5 ingot
No. 115 ..... 27.00
No. 120 ..... 26.25
No. 123 ..... 25.75
80-10-10 ingot
No. 305 ..... 31.50
No. 315 ..... 29.25
88-10-2 ingot
No. 210 ..... 41.25
No. 215 ..... 37.75
No. 245 ..... 33.25
Yellow ingot
No. 405 ..... 23.25
Manganese bronze
No. 421 ..... 26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper, max. 22.50-22.75
0.60 copper, max. 22.25-22.50
Piston alloys (No. 122 type) .. 20.00-21.25
No. 12 alum. (No. 2 grade) ... 19.25-19.75
108 alloy 19.75-20.25
195 alloy 21.00-21.50
13 alloy (0.60 copper max.) ... 22.25-22.50
ASX-679 ..... 19.75-20.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½% 20.00-20.50
Grade 2—92-95% 19.00-19.50
Grade 3—90-92% 18.00-18.50
Grade 4—85-90% 17.00-17.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper
Cast, oval, 15 in. or longer 42.64
Electrodeposited 41.88
Flat rolled 45.04
Brass, 80-20
Cast, oval, 15 in. or longer 43.515
Zinc, flat cast 20.25
Ball, anodes 18.50
Nickel, 99 pct plus
Cast 84.00
Cadmium $1.70
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn. 94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum 63.00
Copper sulfate, 99.5 crystals, bbl... 12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed 30.00
Nickel chloride, 375 lb drum 38.00
Silver cyanide, 100 oz. lots, per oz. 75½
Sodium cyanide, 96 pct domestic 200 lb drums 19.25
Zinc cyanide, 100 lb drum 54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	22¼
Comm. bronze	23⅞	23½
Mang. bronze	18¼	17½
Yellow brass rod ends	19½	....

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 27 —27¼
No. 2 copper wire ..... 25½—25¾
Light copper ..... 24 —24¼
*Refinery brass ..... 22¾—23
*Dry copper content.

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 27 —27¼
No. 2 copper wire ..... 25½—25¾
Light copper ..... 24 —24¼
No. 1 composition 21½
No. 1 comp. turnings 20½
Rolled brass 17½
Brass pipe 18½
Radiators ..... 17¼—17½
Aluminum
Mixed old cast. ..... 12 —12½
Mixed new clips ..... 13 —13½
Mixed turnings, dry ..... 12½—13
Pots and pans ..... 12 —12½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire. 24½—25
No. 2 heavy copper and wire. 23 —23½
Light copper ..... 21 —21½
New type shell cuttings 20½
Auto radiators (unsweated) .. 15
No. 1 composition ..... 19 —19½
No. 1 composition turnings .. 18½—19
Unlined red car boxes 16
Cocks and faucets ..... 16 —16½
Mixed heavy yellow brass ... 13
Old rolled brass 15¼
Brass pipe ..... 16½—17
New soft brass clippings .... 17½—18
Brass rod ends ..... 15 —16
No. 1 brass rod turnings .... 14 —15

Aluminum

Alum. pistons and struts .... 7 — 8
Aluminum crankcases 10
2S aluminum clippings 13
Old sheet and utensils 10
Borings and turnings ..... 6 — 7
Misc. cast aluminum 10
Dural clips (24S) 11

Zinc

New zinc clippings ..... 6 — 6½
Old zinc ..... 4¾— 5
Zinc routings ..... 3 — 3¼
Old die cast scrap ..... 3 — 3¼

Nickel and Monel

Pure nickel clippings ..... 60 —65
Clean nickel turnings 40
Nickel anodes ..... 60 —65
Nickel rod ends ..... 60 —65
New Monel clippings ..... 23 —25
Clean Monel turnings ..... 16 —18
Old sheet Monel ..... 21 —23
Nickel silver clippings, mixed. 15
Nickel silver turnings, mixed. 13

Lead

Soft scrap lead ..... 10½—11¼
Battery plates (dry) ..... 5¾— 6
Batteries, acid free 4¼

Magnesium

Segregated solids ..... 18½—19
Castings ..... 17½—18

Miscellaneous

Block tin ..... 75 —80
No. 1 pewter ..... 55 —60
No. 1 auto babbitt ..... 45 —48
Mixed common babbitt ..... 12½—13
Solder joints 16¾
Siphon tops 45
Small foundry type 15½
Monotype 14
Lino. and stereotype 13
Electrotype 11½
Hand picked type shells 8½
Lino. and stereo. dross ..... 5¼— 5½
Electro dross ..... 3½— 4

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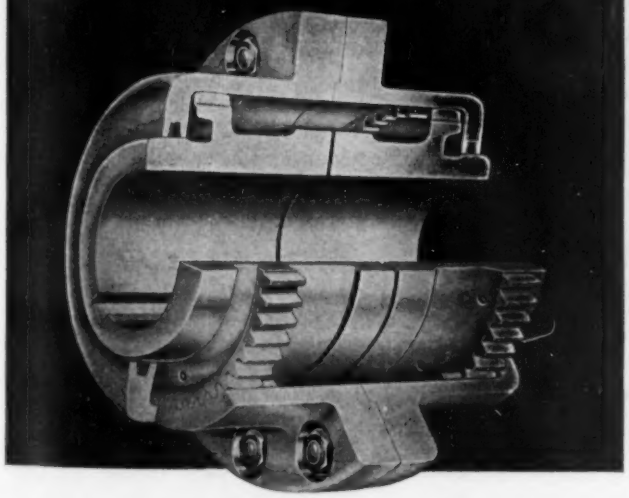

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Slow Market Suffers Price Declines

Upcoming vacations, uncertainty on wage settlement dry up sales . . . Composite falls to $26.92 . . . Cast grades up in some centers, down in others.

The shaky price line reported in Pittsburgh last week gave way to join Chicago scrap quotations in a $1 drop throughout the steelmaking grades. However, a certain amount of export business being done in Philadelphia, may have acted to prevent a price drop in that stagnant market. Net effect on THE IRON AGE Composite was a 66¢ skid to $26.92.

Strike of Great Lakes Steel Corp., Detroit's biggest consumer, plus vacation shutdowns of two other mills in that dull market area pushed steelmaking grades down a full $2 per ton.

Tumbling industrial prices and buyer apathy exerted a bearish influence on Cleveland and Youngstown scrap prices as openhearth grades fell $2. Same trend was apparent in Cincinnati, but openhearth prices went down only $1.

Cast grades were slow in some scrap centers, but continued strong on the West Coast and in St. Louis. Unstripped motor blocks in the latter area sold at $2 per ton above last week.

Pittsburgh . . . Openhearth prices were off $1 per ton this week. Asking prices were based on this low level in face of consumer disinterest and a plentiful supply of material. Weaker prices from the latest automotive lists also contributed to the decline. Railroad quotations were down $1, and cast was off $1 to $2 per ton. Blast furnace grades declined $1. Outlook for July is for a continued depressed market.

Chicago . . . In dull Chicago market, sales, where made, reflected a further drop with the exception of several railroad grades. A clearer future for steel bargaining might bring prices up slightly it was felt, but in the meantime asking prices continued to fall, and those mills with unfilled orders found pressure for shipment. It appeared that a longer holdout by brokers who had few orders to fill might bring a rash of spot dealer to broker sales at $1 to $2 under prevailing prices, where the broker could be sold at all. With the foundry vacation period beginning, foundry grades were dull.

Philadelphia . . . Export business now being done in Philadelphia is being filled entirely out of yard stocks and has had no direct effect on the market. An indirect effect is that it may have prevented or delayed a price skid. Only prices to change this week were chemical borings, off $2, and malleable cast, also down $2.

New York . . . Members of the trade contacted by THE IRON AGE were unanimously pessimistic this week. Business is at a low ebb—and the tide may take some time to flow back. With very little trading, prices are unchanged except for chemical borings down $2 per gross ton.

Detroit . . . A premature strike at the biggest consumer, Great Lakes Steel Corp., and vacation periods at the 2 other independent mills dried up the local market completely. With no outside interest, the market slumped a full $2 on openhearth grades. Automotive lists closing this week were expected to reflect even lower levels. Poor foundry business sent cast grades slumping and turnings also edged downward.

Cleveland . . . Blast furnace scrap held firm again this week, but openhearth grades went down $2 on appraisal of a weakening market. Strike thinking had surprisingly little to do with softness here and in the Valley. Vacations, complete lack of buying interest and tumbling industrial prices in adjoining areas were the big factors pushing the bearish trend. Some brokers were pessimistic enough to believe prices might go down at least another $3 before the end of July.

Birmingham . . . With plant vacations starting and the possibility of a strike, purchasing agents seemed apathetic about buying scrap last week. Brokers began receiving orders to hold up shipments on scrap already purchased, but dealers say most of the orders have been shipped. Scrap continues to flow into the yards in increased quantities, reflecting layoffs in industry. Prices were steady on all grades but buying has been light.

St. Louis . . . Uncertainty as to the outcome of the industry's new wage contract with the CIO, plus lack of new business by the mills, have caused continued inactivity in the scrap market, and prices are generally unchanged. Shipments are equal to demand.

Cincinnati . . . Local consumers reportedly will be out of the market for at least 6 weeks. This development, coupled with complete absence of buying in adjoining areas, forced openhearth prices down $1 on appraisal.

Buffalo . . . Market here maintained a steady tone although local dealers and consumers were marking time pending definite action on the industry's labor negotiations. Vacations were also a factor. Buying by outside consumers in the mid-state area which usually ships here was the only bullish note.

Boston . . . Market here is practically dead with absolutely no sales in some grades. No. 1 heavy melting is moving in a trickle, a carload here and there. Prices, however, remain at earlier levels with the sole exception of clean cast chemical borings, which are off $2 on new business for July.

West Coast . . . Los Angeles and Seattle markets continued fairly active with San Francisco far behind. In the Pacific Northwest the two largest buyers were taking all they could get. New tonnage announcements for July were delayed, apparently awaiting end of labor negotiations. Cast continued hot. In the issue of June 17, it was reported that dealer net had dropped as a result of a change in pricing method. This was a mininterpretation and prices actually were increased.

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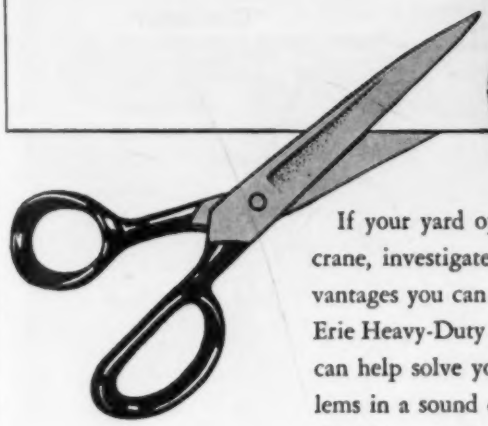

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Scrap Prices

(Effective June 29, 1954)

Pittsburgh

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	28.00 to 29.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and ms. turns.	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs, plate	30.00 to 31.00
Heavy turnings	26.00 to 27.00
No. 1 RR. hvy. melting	30.00 to 31.00
Scrap rails, random lgth.	36.00 to 37.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast.	42.00 to 43.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	30.00 to 31.00

Chicago

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 factory bundles	31.00 to 32.00
No. 1 dealers' bundles	29.00 to 30.00
No. 2 dealers' bundles	20.00 to 21.00
Machine shop turn.	12.00 to 14.00
Mixed bor. and turn.	12.00 to 14.00
Shoveling turnings	14.00 to 16.00
Cast iron borings	14.00 to 15.00
Low phos. forge crops	35.00 to 36.00
Low phos. punch'gs, plate	32.00 to 33.00
Low phos. 3 ft and under	31.00 to 32.00
No. 1 RR. hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	36.00 to 37.00
Rerolling rails	43.00 to 44.00
Rails 2 ft and under	43.00 to 44.00
Locomotive tires, cut	33.00 to 34.00
Cut bolsters & side frames	35.00 to 36.00
Angles and splice bars	37.00 to 38.00
RR. steel car axles	40.00 to 41.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	39.00 to 40.00
Cupola cast	36.00 to 37.00
Heavy breakable cast.	29.00 to 30.00
Cast iron brake shoes	31.00 to 32.00
Cast iron car wheels	33.00 to 35.00
Malleable	40.00 to 41.00
Stove plate	32.00 to 33.00

Philadelphia Area

No. 1 hvy. melting	$22.00 to $23.50
No. 2 hvy. melting	20.00 to 21.50
No. 1 bundles	23.00 to 24.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	12.00 to 13.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Clean cast chem. borings.	20.00 to 21.00
Low phos. 5 ft and under	24.00 to 25.00
Low phos. 2 ft and under	25.00 to 26.00
Low phos. punch'gs	25.00 to 26.00
Elec. furnace bundles	23.00 to 24.00
Heavy turnings	21.00 to 22.00
RR. steel wheels	31.00 to 32.00
RR. spring steel	31.00 to 32.00
Rails 18 in. and under	41.00 to 42.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	35.00 to 36.00
Cast iron carwheels	38.00 to 39.00
Malleable	36.00 to 37.00
Unstripped motor blocks.	27.00 to 28.00
No. 1 machinery cast.	39.00 to 40.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles	25.00 to 26.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	25.00 to 26.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut struct'r'l & plate, 2 ft & under	31.50 to 32.50
Drop forge flashings	25.00 to 26.00
Low phos. 2 ft & under	27.00 to 28.00
No. 1 RR. heavy melting	27.00 to 28.00
Rails 3 ft and under	42.00 to 43.00
Rails 18 in. and under	43.00 to 44.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	19.00 to 20.00
Railroad cast.	41.00 to 42.00
No. 1 machinery cast.	41.00 to 42.00
Stove plate	33.00 to 34.00
Malleable	39.00 to 40.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles	27.00 to 28.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. plate	29.00 to 30.00

Buffalo

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 busheling	26.00 to 27.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.50 to 15.50
Mixed bor. and turn.	17.50 to 18.50
Shoveling turnings	18.00 to 18.50
Cast iron borings	17.50 to 18.50
Low phos. plate	29.00 to 30.00
Scrap rails, random lgth.	33.00 to 34.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast.	37.00 to 38.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$20.00 to $21.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 bundles, openhearth	22.00 to 23.00
No. 2 bundles	17.00 to 18.00
New busheling	20.00 to 21.00
Drop forge flashings	20.00 to 21.00
Machine shop turn.	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	9.00 to 10.00
Low phos. punch's, plate.	21.00 to 22.00
No. 1 cupola cast.	32.00
Heavy breakable cast.	23.00
Stove plate	28.00
Automotive cast.	36.00

St. Louis

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.50 to 24.50
No. 1 bundles	25.00 to 26.00
No. 2 bundles	19.50 to 20.50
Machine shop turn.	12.00 to 13.00
Cast iron borings	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
No. 1 RR. hvy. melting	30.00 to 31.00
Rails, random lengths	38.00 to 39.00
Rails, 18 in. and under	43.00 to 44.00
Locomotive tires, uncut	31.00 to 32.00
Angles and splice bars	31.00 to 32.00
Std. steel car axles	40.00 to 41.00
RR. spring steel	31.50 to 33.50
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	29.00 to 30.00
Cast iron brake shoes	30.00 to 31.00
Stove plate	37.00 to 38.00
Cast iron car wheels	30.00 to 31.00
Malleable	37.00 to 38.00
Unstripped motor blocks.	29.00 to 30.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$16.00 to $17.00
No. 2 hvy. melting	13.00 to 14.00
No. 2 bundles	12.00 to 13.00
Machine shop turn.	5.00 to 6.00
Mixed bor. and turn.	7.00 to 8.00
Shoveling turnings	8.00 to 9.00
Clean cast chem. borings.	14.00 to 15.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	29.00 to 30.00
Unstripped motor blocks.	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	20.00
No. 2 bundles	$15.00 to 16.00
No. 1 busheling	20.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	13.00 to 14.00
Electric furnace bundles	26.00 to 27.00
Bar crops and plate	29.00 to 30.00
Structural and plate, 2 ft	29.00 to 30.00
No. 1 RR. hvy. melting	26.00 to 27.00
Scrap rails, random lgth.	34.00 to 35.00
Rails, 18 in. and under	37.50 to 38.50
Angles & splice bars	36.00 to 37.00
Rerolling rails	39.00 to 40.00
No. 1 cupola cast.	43.50 to 44.50
Stove plate	40.50 to 41.50
Charging box cast.	19.00 to 20.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks.	34.50 to 35.50
Mashed tin cans	15.00 to 16.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$16.50 to $17.00
No. 2 hvy. melting	14.50 to 15.00
No. 1 bundles	16.50 to 17.00
No. 2 bundles	11.00 to 12.25
No. 1 busheling	16.00 to 17.00
Elec. furnace, 3 ft & under	17.00
Machine shop turn.	3.00 to 4.00
Mixed bor. and short turn.	6.00 to 7.00
Shoveling turnings	8.00 to 9.00
Clean cast chem. borings.	9.00 to 10.00
No. 1 machinery cast.	27.00 to 29.00
*Mixed cupola cast.	25.00 to 26.00
Heavy breakable cast.	23.50 to 24.00
Stove plate	24.00 to 25.00
Unstripped motor blocks.	7.00 to 8.00
*Correct price last week	26.00 to 27.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.50 to 14.50
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Low phos., 18 in. & under	32.00 to 33.00
Rails, random lengths	37.00 to 38.00
Rails, 18 in. and under	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00
Hvy. breakable cast.	36.00 to 37.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	23.00
No. 1 cupola cast.	$43.00 to 46.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	17.00
No. 2 bundles	$15.50 to 16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Shoveling turnings	7.00 to 9.00
Cast iron borings	7.00 to 9.00
Elec. fur. 1 ft and under.	25.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	43.00 to 45.00

Seattle

No. 1 hvy. melting	$23.00 to $25.00
No. 2 hvy. melting	19.00 to 21.00
No. 1 bundles	21.50
No. 2 bundles	17.00
No. 3 bundles	12.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bushelings	17.00
Bush., new fact prep'd	20.00
Bush., new fact unprep'd	16.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, remelting	31.00
Cast scrap	$42.00 to 45.00

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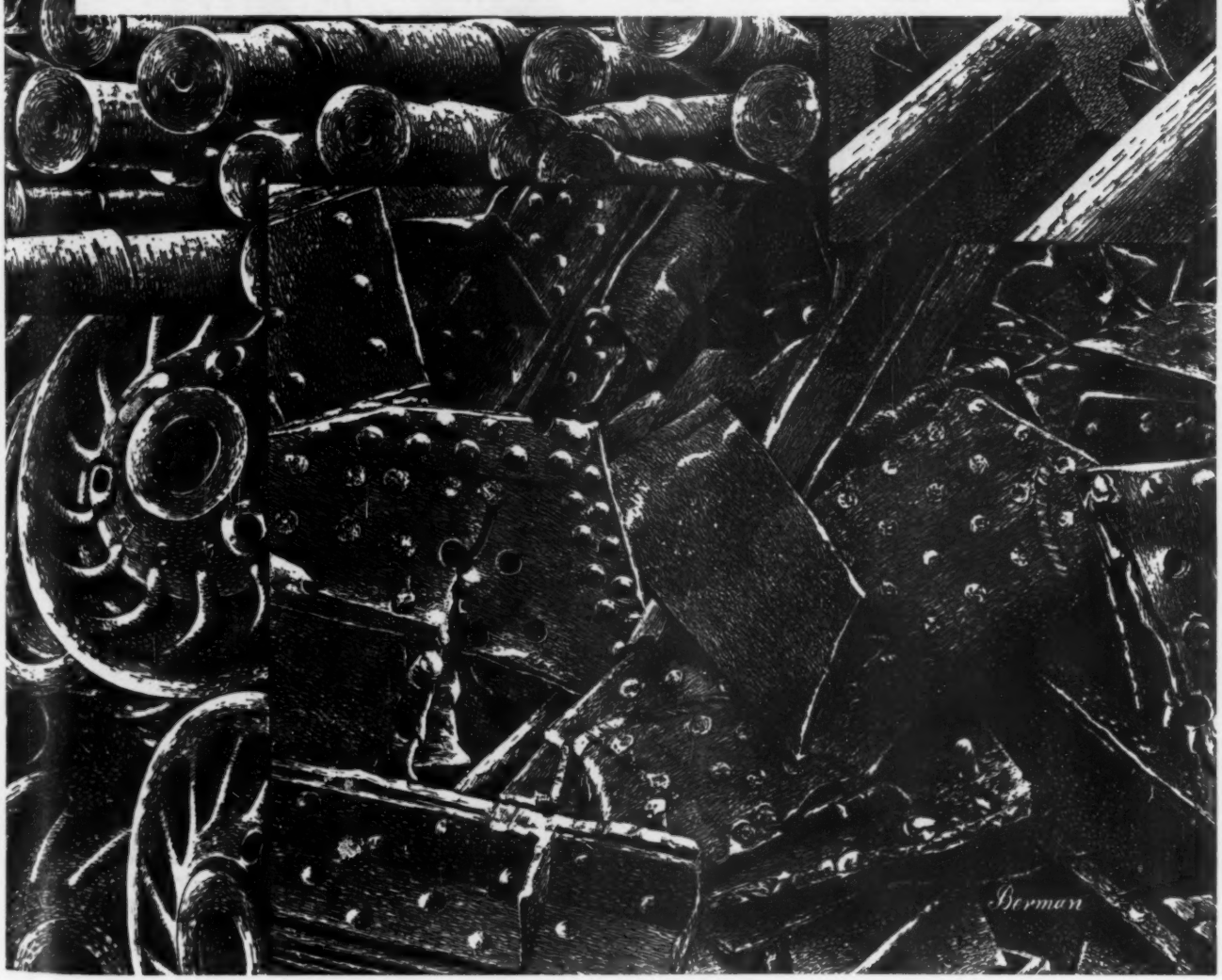

Comparison of Prices

(Effective June 29, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland Youngstown.

Price advances over previous week are printed in **Heavy Type**: declines appear in *Italics*.

	June 29 1954	June 22 1954	June 1 1954	June 30 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.925¢
Cold-rolled sheets	4.775	4.775	4.775	4.775
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.275
Hot-rolled strip	3.925	3.925	3.925	3.925
Cold-rolled strip	5.513	5.513	5.513	5.575
Plate	4.10	4.10	4.10	4.10
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. terns	7.75	7.75	7.75	7.75
Bars and Shapes. (per pound)				
Merchant bars	4.16¢	4.16¢	4.16¢	4.15¢
Cold finished bars	5.22	5.22	5.22	5.20
Alloy bars	4.875	4.875	4.875	4.875
Structural shapes	4.10	4.10	4.10	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.525¢	5.525¢	5.525¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	$4.325	$4.325	$4.325	$4.325
Light rails	5.20	5.20	5.20	5.20
Semifinished Steel: (per net ton)				
Rerolling billets	$62.00	$62.00	$62.00	$62.00
Slabs, rerolling	62.00	62.00	62.00	62.00
Forging billets	75.50	75.50	75.50	75.50
Alloy blooms, billets, slab	82.00	82.00	82.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.525¢	4.525¢	4.525¢	4.525¢
Skelp	3.75	3.75	3.75	3.75
Finished Steel Composite: (per pound)				
Base price	4.634¢	4.634¢	4.634¢	4.634¢

	June 29 1954	June 22 1954	June 1 1954	June 30 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$60.69
Foundry, Valley	56.50	56.50	56.50	55.75
Foundry, Southern, Cin'ti	60.43	60.43	60.43	59.43
Foundry, Birmingham	52.88	52.88	52.88	51.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic del'd, Philadelphia	60.27	60.27	60.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	55.25
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	55.75
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	10.00¢
‡ 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$56.01
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$28.50*	$29.50	$30.50	$45.50
No. 1 steel, Phila. area	22.75	22.75	22.75	43.50
No. 1 steel, Chicago	*29.50*	30.50	32.50	41.50
No. 1 bundles, Detroit	*22.50*	24.50	26.00	37.50
Low phos., Youngstown	*29.50*	31.50	31.50	47.50
No. 1 mach'y cast, Pittsburgh	*42.50*	43.50	43.50	49.50
No. 1 mach'y cast, Philadel'a.	39.50	39.50	39.50	45.50
No. 1 mach'y cast, Chicago	*39.50*	40.50	42.00	44.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$26.92*	$27.58	$28.58	$43.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.75
Foundry coke, prompt	16.75	16.75	16.75	17.25

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.875‡
Copper, Lake, Conn.	30.00	30.00	30.00	30.125
Tin, Straits, New York	95.875†	94.125*	93.75	90.50
Zinc, East St. Louis	11.00	11.00	10.50	11.00
Lead, St. Louis	13.80	13.80	13.80	13.80
Aluminum, virgin ingot	21.50	21.50	21.50	20.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on p. 161 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *S5*	52.38	52.88	.....	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *H1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.25	61.75	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct., $2 per ton for .05 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1*, *G1*, $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct. or more phosphorus. Add 75¢ for each 0.50 pct. manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	38.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75	50.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

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If you are interested in minimum machining and assembly costs — ease of welding — better distribution of metal — better strength and weight ratios — better fit — better performance — greater fatigue resistance — longer life and less replacement — you should be interested in "C" electric furnace steel castings because these foundry engineered castings give you steel at its best. And — by virtue of alloy and heat treating — they offer you a choice of mechanical properties to fit your specific needs.

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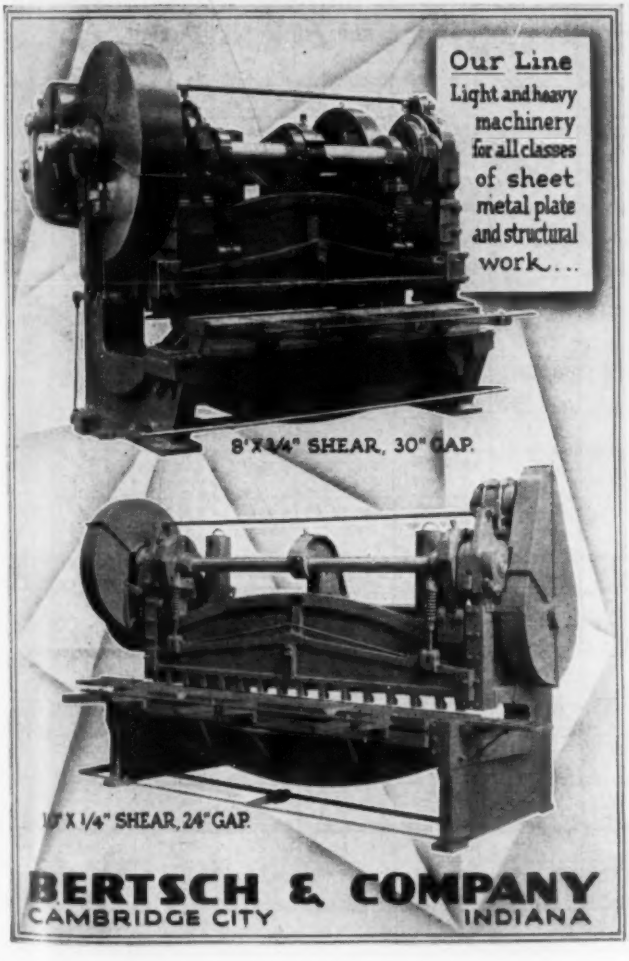
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8' X 3/4" SHEAR, 30" GAP.
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FOR ALL METAL CUTTING MACHINERY

Illustrated is a Cincinnati Gilbert 4'-11" column Radial Drill equipped with a Gusher Coolant Pump.

Ruthman Gusher Coolant Pumps are better three ways

1. Gusher Coolant Pumps give you split-second coolant flow when the machine is turned on.
2. Pre-lubricated heavy-duty ball-bearings, totally enclosed drip proof motor, elimination of packing and priming, cut maintenance to a minimum.
3. Electronically balanced rotating assembly with no metal to metal contact assures long life.

Always Specify Gusher Coolant Pumps

THE RUTHMAN MACHINERY CO.

1809-1823 Reading Road Cincinnati 2, Ohio

IRON AGE

STEEL PRICES

(Effective June 29, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$82.00 *B3*		4.15 *B3*	6.20 *B3*	4.15 *B3*						
	Buffalo, N. Y.	$62.00 *B3*	$75.50 *B3, R3*	$82.00 *B3, R3*	4.925 *B3*	4.15 *B3*	6.20 *B3*	4.15 *B3*	3.925 *B3, R3*	5.45 *B3, R7*	6.00 *B3*	8.425 *B3*		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.								4.05 *A2*		5.90 *A2*			
	New Bedford, Mass.									6.00 *R6*				
	Harrison, N. J.													12.00 *C11*
	Johnstown, Pa.	$62.00 *B3*	$75.50 *B3*	$82.00 *B3*		4.15 *B3*	6.20 *B3*							
	Fairless, Pa.													
	New Haven, Conn.									5.90 *D1* 6.20 *A5*				
	Phoenixville, Pa.					3.80 *P2*		3.80 *P2*						
	Sparrows Pt., Md.								3.925 *B3*	5.45 *B3*	6.00 *B3*	8.425 *B3*		
	Wallingford, Conn.									5.90 *W1*				
	Worcester, Mass.									6.30 *A5*				12.30 *A5* 12.45 *N7*
MIDDLE WEST	Alton, Ill.								4.10 *L1*					
	Ashland, Ky.								3.925 *A7*					
	Canton-Massillon, Dover, Ohio			$82.00 *R3, T5*										12.00 *G4*
	Chicago, Ill.	$62.00 *U1*	$75.50 *R3, U1, W8*	$82.00 *U1, W8, R3*	4.925 *U1*	4.10 *U1, W8*	6.175 *U1, Y1*	4.10 *U1*	3.925 *A1, W8*	5.70 *A1*	5.95 *R3*		6.40 *W8*	
	Cleveland, Ohio		$75.50 *R3*							5.45 *A5, J3*		7.80 *J3* 8.15 *A5*		12.00 *A5* 12.15 *N7*
	Detroit, Mich.			$84.00 *R5*					4.075 *G3* 4.15 *M2*	5.60 *D1, D2, G3, M2, P11*	6.10 *G3*	7.90 *D2* 8.30 *G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$62.00 *U1*	$75.50 *U1*	$82.00 *U1, Y1*	4.925 *I3*	4.10 *I3, U1*	6.175 *U1, I3*		3.925 *I3, U1, Y1*	5.70 *I3*	5.95 *U1, I3* 6.45 *Y1*		6.40 *U1*	
	Granite City, Ill.													
	Indianapolis, Ind.									5.60 *C5*				
	Mansfield, Ohio													
	Middletown, Ohio									5.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								3.925 *S1, R3*	5.45 *S1, T4, R3*	5.95 *S1, R3*	7.60 *R3* 7.65 *S1*	6.40 *S1*	12.00 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$62.00 *U1, J3*	$75.50 *J3, U1*	$82.00 *U1, C11*	4.925 *U1*	4.10 *J3, U1*	6.175 *J3, U1*	4.10 *U1*	3.925 *A7, P6* 3.95 *S7* 4.425 *S9*	5.45 *B4, J3, S7*		7.80 *J3*	6.40 *S9* 6.45 *S7*	12.00 *S9* 12.15 *S7*
	Portsmouth, Ohio								3.925 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.10 *W3*			3.925 *W3*	5.45 *F3, W3*	5.95 *W3*	8.15 *W3*		
	Youngstown, Ohio			$82.20 *Y1, C10*		4.10 *Y1*	6.675 *Y1*		3.925 *U1, Y1*	5.45 *Y1, C5*	5.95 *U1* 6.45 *Y1*	8.30 *Y1*	6.40 *U1*	12.00 *C5*
WEST	Fontana, Cal.	$70.00 *K1*	$83.50 *K1*	$101.00 *K1*		4.75 *K1*	6.825 *K1*	5.10 *K1*	4.70 *K1*	7.35 *K1*	7.05 *K1*		7.80 *K1*	13.65 *K1*
	Geneva, Utah		$75.50 *C7*			4.10 *C7*	6.175 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.775 *S2*		4.525 *S2*		6.55 *S2*		7.00 *S2*	
	Los Angeles, Torrance, Cal.		$85.00 *B2*	$102.00 *B2*		4.80 *B2, C7*	6.85 *B2*		4.675 *B2, C7*	7.50 *C1*			7.60 *B2*	
	Minnequa, Colo.					4.55 *C6*			5.025 *C6*					
	San Francisco, Niles, Pittsburg, Cal.		$85.00 *B2*			4.75 *B2* 4.91 *P9*	6.80 *B2*		4.675 *B2, C7*					
	Seattle, Wash.		$89.00 *B2*			4.85 *B2*	6.90 *B2*		4.90 *P12*					
SOUTH	Atlanta, Ga.								4.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$62.00 *T2*	$75.50 *T2*			4.10 *R3, T2*	6.175 *T2*		3.925 *R3, T2, C16*		5.95 *T2*			
	Houston, Tex.		$83.50 *S2*	$90.00 *S2*		4.50 *S2*			4.325 *S2*				6.80 *S2*	

IRON AGE

STEEL PRICES

(Effective June 29, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	3.925 *B3*	4.775 *B3*				5.90 *B3*	7.225 *B3*			4.525 *W6*			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	3.975 *A2*					5.90 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.525 *B3*			
	Fairless, Pa.	3.975 *U1*	4.825 *U1*				5.95 *U1*	7.275 *U1*				$8.80 *U1*	$7.50 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	3.925 *B3*	4.775 *B3*	5.275 *B3*			5.90 *B3*	7.225 *B3*	8.075 *B3*		4.625 *B3*	$8.80 *B3*	$7.50 *B3*	
	Worcester, Mass.										4.825 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										4.70 *L1*			
	Ashland, Ky.	3.925 *A7*		5.275 *A7*	5.175 *A7*									
	Canton-Massillon, Dover, Ohio			5.275 *R1, R3*						5.05 *R1*				
	Chicago, Joliet, Ill.	3.925 *A1, W8*					5.90 *U1*				4.525 *A5, N4, R3*			
	Sterling, Ill.										4.625 *N4*			
	Cleveland, Ohio	3.925 *J3, R3*	4.775 *J3, R3*		5.175 *R3*		5.90 *J3, R3*	7.225 *J3, R3*			4.525 *A5*			
	Detroit, Mich.	4.075 *G3, M2*	4.925 *G3*				6.05 *G3*	7.375 *G3*						
	Newport, Ky.	3.925 *N5*												
	Gary, Ind. Harbor, Indiana	3.925 *I3, U1, Y1*	4.775 *I3, U1, Y1*	5.275 *U1, I3*	5.175 *I3, U1*	5.675 *U1*	5.90 *U1, I3* 6.40 *Y1*	7.225 *U1* 7.725 *Y1*				$8.70 *I3, U1, Y1*	$7.40 *I3, U1*	6.10 *U1, Y1*
	Granite City, Ill.	4.125 *G2*	4.975 *G2*	5.475 *G2*	5.375 *G2*								$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.025 *C9*		5.375 *C9*						5.025 *C9*	4.625 *C9*			
	Mansfield, Ohio					5.675 *E2*				5.05 *E2*				
	Middletown, Ohio		4.775 *A7*		5.175 *A7*	5.675 *A7*								
	Niles, Ohio Sharon, Pa.	3.925 *S1, R3* 5.175 *N3*	4.775 *R3* 5.80 *N3*	5.275 *N3*	6.525 *N3*	5.45 *S1* 5.675 *N3*	5.90 *S1, R3*	7.225 *R3*				$8.70 *R3*	$7.40 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	3.925 *J3, U1, P6, A7*	4.775 *J3, U1, P6*	5.275 *U1*	5.175 *U1*		5.90 *J3, U1*	7.225 *J3, U1*	7.925 *U1*		4.525 *A5* 4.725 *P6*	$8.70 *J3, U1*	$7.40 *J3, U1*	6.10 *U1*
	Portsmouth, Ohio	3.925 *P7*	4.775 *P7*								4.525 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	3.925 *W3, W5*	4.775 *W3, W5, F3*	5.275 *W3, W5*		5.675 *W3, W5*	5.90 *W3*	7.225 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.10 *F3, W5*
	Youngstown, Ohio	3.925 *U1, Y1*	4.775 *Y1*		5.175 *Y1*		5.90 *U1*, 6.40 *Y1*	7.725 *Y1*			4.525 *Y1*			
WEST	Fontana, Cal.	4.70 *K1*	5.875 *K1*				6.675 *K1*	8.275 *K1*			5.325 *K1*			
	Geneva, Utah	4.025 *C7*												
	Kansas City, Mo.									4.775 *C6*	4.865 *S2*			
	Los Angeles, Torrance, Cal.	4.625 *C7*		6.275 *C7*							5.325 *B2*			
	Minnequa, Colo.										4.775 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.625 *C7*	5.725 *C7*	6.025 *C7*							5.175 *C7*	$9.45 *C7*	$8.15 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	3.925 *R3, T2*	4.775 *T2*	5.275 *R3, T2*			5.90 *T2*			5.125 *T2* 5.225 *R3*	4.525 *T2 R3*	$8.80 *T2*	$7.50 *T2*	
	Houston, Texas	4.325 *S2*									4.925 *S2*			

† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box.
* COKES: 1.50 lb add 25¢.
ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢; 1.00-lb add $1.20.

IRON AGE

STEEL PRICES

(Effective June 29, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg's. Bright
EAST	Bethlehem, Pa.				4.875 *B3*	6.325 *B3*	6.225 *B3*					
	Buffalo, N. Y.	4.15 *B3* 4.18 *R3*	4.15 *B3,R3*	5.25 *B5*	4.875 *B3,R3*	6.325 *B3,B5*	6.225 *B3*	4.10 *B3*			6.25 *B3*	5.525 *W6*
	Claymont, Del.							4.10 *C4*		5.55 *C4*		
	Coatesville, Pa.							4.10 *L4*		5.55 *L4*		
	Conshohocken, Pa.							4.10 *A2*	5.15 *A2*		6.25 *A2*	
	Harrisburg, Pa.							3.85 *C3*	5.15 *C3*			
	Hartford, Conn.			5.70 *R3*		6.775 *R3*						
	Johnstown, Pa.	4.15 *B3*	4.15 *B3*		4.875 *B3*		6.225 *B3*	4.10 *B3*		5.55 *B3*	6.25 *B3*	5.525 *B3*
	Fairless, Pa.	4.30 *U1*	4.30 *U1*		5.025 *U1*							
	Newark, N. J.			5.65 *W10*		6.65 *W10*						
	Camden, N. J.			5.65 *P10*		6.50 *P10*						
	Putnam, Conn.			5.75 *W10*								
	Sparrows Pt., Md.		4.15 *B3*					4.10 *B3*		5.55 *B3*	6.25 *B3*	5.625 *B3*
	Palmer, Worcester, Mansfield Mass.			5.75 *B5* 6.10 *W11*		6.775 *B5*						5.825 *A5, W6*
	Readville, Mass.			5.75 *C14*								
MIDDLE WEST	Alton, Ill.	4.35 *L1*										5.70 *L1*
	Ashland, Ky.							4.10 *A7*				
	Canton-Massillon, Ohio			5.20 *R2* 5.24 *R3*	4.875 *R3,T5*	6.325 *R2,R3, T5*						
	Chicago, Joliet, Ill.	4.15 *U1, N4,W8* 4.22 *R3*	4.15 *R3,N4*	5.20 *A5,W10, W8,B5,L2*	4.875 *U1, W8,R3*	6.325 *A5,W8, W10,L2, R3,B5*		4.10 *U1,W8*	5.15 *U1*	5.55 *U1*	6.25 *U1*	5.525 *A1, R3,N4,W7*
	Cleveland, Ohio	4.21 *R3*	4.15 *R3*	5.20 *A5,C13*		6.325 *A5, C13*		4.10 *J3,R3*	5.15 *J3*		6.25 *J3*	5.525 *A5, C13*
	Detroit, Mich.	4.30 *R5,G3*		5.35 *R5,P8* 5.40 *B5* 5.45 *P3*	4.975 *R5* 5.025 *G3*	6.425 *R5* 6.475 *P8* 6.525 *B5,P3*	6.375 *G3*	4.25 *G3*			6.40 *G3*	
	Duluth, Minn.											5.525 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.15 *I3, U1, Y1*	4.15 *I3, U1, Y1*	5.27 *R3*	4.875 *I3, U1, Y1*	6.325 *R3,M5*	6.225 *U1,I3* 6.725 *Y1*	4.10 *I3, U1, Y1*	5.15 *I3*	5.55 *U1*	6.25 *U1,I3* 6.75 *Y1*	5.625 *M4*
	Granite City, Ill.							4.30 *G2*				
	Kokomo, Ind.											5.625 *C9*
	Sterling, Ill.	4.25 *N4*	4.25 *N4*									5.625 *N4*
	Niles, Ohio Sharon, Pa.							4.10 *S1*		5.55 *S1*	6.25 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.15 *J3, U1*	4.15 *J3, U1*	5.20 *A5,C8, J3,W10* 5.26 *R3*	4.875 *U1,C11*	6.325 *A5,C11, W10,C8*	6.225 *J3, U1*	4.10 *J3, U1*	5.15 *U1*	5.55 *U1*	6.25 *J3, U1*	5.525 *A5, J3,P6*
	Portsmouth, Ohio											5.525 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.15 *W3*						4.10 *W3*				
	Youngstown, Ohio	4.15 *U1, Y1* 4.20 *R3*	4.15 *R3, U1, Y1*	5.20 *Y1,F2*	4.875 *U1, Y1, C10*	6.325 *Y1, C10,F2*	6.225 *U1* 6.725 *Y1*	4.10 *U1, Y1*			6.75 *Y1*	5.525 *Y1*
WEST	Emeryville, Cal.	4.90 *J5*	4.90 *J5*									
	Fontana, Cal.	4.85 *K1*	4.85 *K1*		5.925 *K1*		7.475 *K1*	4.75 *K1*		6.60 *K1*	6.95 *K1*	
	Geneva, Utah							4.10 *C7*			6.25 *C7*	
	Kansas City, Mo.	4.75 *S2*	4.75 *S2*		5.475 *S2*		6.825 *S2*					6.125 *S2*
	Los Angeles, Torrance, Cal.	4.85 *B2,C7*	4.85 *B2,C7*	6.65 *R3* 6.96 *R3*	5.925 *B2*		6.925 *B2*					6.475 *B2*
	Minnequa, Colo.	4.60 *C6*	4.75 *C6*					4.95 *C6*				5.775 *C6*
	Portland, Ore.	4.90 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	4.85 *C7,P9* 4.90 *B2*	4.85 *C7,P9* 4.90 *B2*				6.975 *B2*					6.475 *C7*
	Seattle, Wash.	4.90 *B2,N6, P12*	4.90 *B2,P12*				6.975 *B2*	5.00 *B2*			7.15 *B2*	
SOUTH	Atlanta, Ga.	4.35 *A8*	4.35 *A8*									5.725 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.15 *T2,C16* 4.18 *R3*	4.15 *R3,T2, C16*				6.225 *T2*	4.10 *R3,T2*			6.25 *T2*	5.525 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.275 *S2*			4.50 *L3,S2*				5.925 *S2*

Steel Prices

(Effective June 29, 1954)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Fred Ulbrich & Sons, Wallingford, Conn.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	24.25	9.0	27.25	13.0	29.75	16.5	32.25	17.25	32.75	18.25	33.25	18.75	34.75	18.5								
Youngstown *R3*	26.25	11.0	29.25	15.0	31.75	18.5	34.25	19.25	34.75	20.25	35.25	20.75	36.75	20.5								
Fontana *K1*	13.25	+2.0	16.25	2.0	18.75	5.5	21.25	6.25	21.75	7.25	22.25	7.75	23.75	7.5								
Pittsburgh *J3*	26.25	11.0	29.25	15.0	31.75	18.5	34.25	19.25	34.75	20.25	35.25	20.75	36.75	20.5	15.75	0.75	19.75	3.0	22.25	5.5	23.75	7.0
Alton, Ill. *L1*	24.25	9.0	27.25	13.0	29.75	16.5	32.25	17.25	32.75	18.25	33.25	18.75	34.75	18.5								
Sharon *M3*	26.25	11.0	29.25	15.0	31.75	18.5	34.25	19.25	34.75	20.25	35.25	20.75	36.75	20.5								
Fairless *N2*	24.25	9.0	27.25	13.0	29.75	16.5	32.25	17.25	32.75	18.25	33.25	18.75	34.75	18.5								
Pittsburgh *N1*	26.25	11.0	29.25	15.0	31.75	18.5	34.25	19.25	34.75	20.25	35.25	20.75	36.75	20.5	15.75	0.75	19.75	3.0	22.25	5.5	23.75	7.0
Wheeling *W5*	26.25	11.0	29.25	15.0	31.75	18.5	34.25	19.25	34.75	20.25	35.25	20.75	36.75	20.5								
Wheatland *W4*	26.25	11.0	29.25	15.0	31.75	18.5	34.25	19.25	34.75	20.25	35.25	20.75	36.75	20.5								
Youngstown *Y1*	26.25	11.0	29.25	15.0	31.75	18.5	34.25	19.25	34.75	20.25	35.25	20.75	36.75	20.5	15.75	0.75	19.75	3.0	22.25	5.5	23.75	7.0
Indiana Harbor *Y1*	25.25	10.0	28.25	14.0	30.75	17.5	33.25	18.25	33.75	19.25	34.25	19.75	35.75	19.5								
Lorain *N2*	26.25	11.0	29.25	15.0	31.75	18.5	34.25	19.25	34.75	20.25	35.25	20.75	36.75	20.5	15.75	0.75	19.75	3.0	22.25	5.5	23.75	7.0
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt *B3*	27.75	14.0	31.75	18.0	33.75	21.5	34.25	20.25	34.75	21.25	35.25	21.75	35.75	20.5								
Youngstown *R3*	29.75	16.0	33.75	20.0	35.75	23.5	36.25	22.25	36.75	23.25	37.25	23.75	37.75	22.5								
Fairless *N2*	27.75	14.0	31.75	18.0	33.75	21.5	34.25	20.25	34.75	21.25	35.25	21.75	35.75	20.5								
Fontana *K1*	16.75		20.75		22.75		23.25		23.75		24.25		24.75									
Pittsburgh *J3*	29.75	16.0	33.75	20.0	35.75	23.5	36.25	22.25	36.75	23.25	37.25	23.75	37.75	22.5	16.25	2.25	20.75	5.5	23.75	8.0	28.75	13.0
Alton, Ill. *L1*	27.75	14.0	31.75	18.0	33.75	21.5	34.25	20.25	34.75	21.25	35.25	21.75	35.75	20.5								
Sharon *M3*	29.75	16.0	33.75	20.0	35.75	23.5	36.25	22.25	36.75	23.25	37.25	23.75	37.75	22.5								
Pittsburgh *N1*	29.75	16.0	33.75	20.0	35.75	23.5	36.25	22.25	36.75	23.25	37.25	23.75	37.75	22.5	16.25	2.25	20.75	5.5	23.75	8.0	28.75	13.0
Wheeling *W5*	29.75	16.0	33.75	20.0	35.75	23.5	36.25	22.25	36.75	23.25	37.25	23.75	37.75	22.5								
Wheatland *W4*	29.75	16.0	33.75	20.0	35.75	23.5	36.25	22.25	36.75	23.25	37.25	23.75	37.75	22.5								
Youngstown *Y1*	29.75	16.0	33.75	20.0	35.75	23.5	36.25	22.25	36.75	23.25	37.25	23.75	37.75	22.5	16.25	2.25	20.75	5.5	23.75	8.0	28.75	13.0
Indiana Harbor *Y1*	28.75	15.0	32.75	19.0	34.75	22.5	35.25	21.25	35.75	22.25	36.25	22.75	36.75	21.5								
Lorain *N2*	29.75	16.0	33.75	20.0	35.75	23.5	36.25	22.25	36.75	23.25	37.25	23.75	37.75	22.5	16.25	2.25	20.75	5.5	23.75	8.0	28.75	13.0

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 4½ pt. higher discount. Buttweld jobbers' discount, 5 pct.

Galvanized discounts based on zinc price in range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price in range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

Steel Prices

(Effective June 29, 1954)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.325	5.20	5.275				
So. Chicago *R3*				7.05			
Cleveland *R3*							
Ensley *T2*	4.325	5.20					
Fairfield *T2*		5.20		7.05		5.125	
Gary *U1*	4.325	5.20				5.125	
Ind. Harbor *I3*	4.325		5.275	7.05		5.125	
Johnstown *B3*		5.20					
Joliet *U1*		5.20	5.275				
Kansas City *S2*				7.05			11.00
Lackawanna *B3*	4.325	5.20	5.275			5.125	11.00
Lebanon *B3*				7.05	10.50		11.00
Minnequa *C6*	4.325	5.70	5.275	7.05		5.125	11.00
Pittsburgh *O1*					10.50		11.00
Pittsburgh *P5*					10.50		11.00
Pittsburgh *J3*				7.05			
Pitt'g, Cal. *C7*						5.275	
Seattle *B7*				7.55		5.275	11.50
Steelton *B3*	4.325		5.275			5.125	
Struthers *Y1*							
Torrance *C7*						5.275	
Youngstown *R3*				7.05			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		8.05	
Armature	8.15	8.40	8.90
Elect	8.75	9.00	9.50
Motor	9.75	10.00	10.50
Dynamo	10.65	10.90	11.40
Trans. 72	11.60	11.85	12.35
Trans. 65	12.15	Grain Oriented	
Trans. 58	12.65	Trans. 80	16.25
Trans. 52	13.65	Trans. 73	16.75

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*32.7	
Washington, Pa., *J2*	....	
Claymont, Del., *C4*	....	
New Castle, Ind., *I2*	....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	37.5	
Inconel-carbon		
10 pct., Coatesville, Pa., *L4*	46.10	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	38.90	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	131	140	...	149	153	6.675	7.075
Aliquippa, Pa. *J3*	131	143	...	...	150	6.675	7.20
Atlanta *A8*	133	145	...	151	158	6.775	7.30
Bartonville *K2*	133	145	...	151	158	6.775	7.30
Buffalo *W6*							
Chicago, Ill. *N4*	131	143	...	149	156	6.675	7.225
Cleveland *A6*	137	...	...	...	...	...	...
Cleveland *A5*						6.675	
Crawfordsville *M4*	133	145	...	151	153	6.775	7.325
Donora, Pa. *A5*	131	140	...	149	153	6.675	7.075
Duluth *A5*	131	140	145	149	153	6.675	7.075
Fairfield, Ala. *T2*	131	140	...	149	153	6.675	7.075
Galveston *D4*	139	148					
Houston *S2*	139	148			161	7.075	7.475
Johnstown, Pa. *B3*	131	143	145	...	156	6.675	7.225
Joliet, Ill. *A5*	131	140	...	149	153	6.675	7.075
Kokomo, Ind. *C9*	133	142	...	151	155	6.775	7.175
Los Angeles *B2*						7.625	
Kansas City *S2*	143	152	...	161	165	7.275	7.675
Minnequa *C6*	136	148	150	154	162	6.925	7.325
Monessen *P6*	131	145			157	6.675	7.225
Moline, Ill. *R3*			145				
Pittsburg, Cal. *C7*	150	163	...	173	173	7.625	8.025
Portsmouth *P7*						6.675	
Rankin, Pa. *A5*	131	140			153	6.675	7.075
So. Chicago *R3*	131	140	145	149	153	6.675	7.075
S. San Francisco *C6*					173		
Sparrows Pt. *B3*	133	...	...	151	158	6.775	7.325
Struthers, O. *Y1*						6.675	7.175
Worcester *A5*	137					6.975	
Williamsport, Pa. *S10*	133	...	150	...	...	...	...

Cut Nails, carloads, base $8.00 per keg (less 20¢ to jobbers), at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. *S7**	5.75	7.65	8.60	10.55	12.85
Carnegie, Pa. *S9*		7.65	8.60	10.55	12.85
Cleveland *A5*	5.45	7.65	8.60	10.55	12.85
Detroit *D1*	5.65	7.85	8.80	10.55	.....
Detroit *D2*	5.60	7.85	8.80		
Harrison, N. J. *C11*			8.90	10.85	13.15
Indianapolis *C5*	5.60	7.80	8.60	10.55	.....
New Castle, Pa. *B4*	5.80	8.00	8.60		
New Haven, Conn. *D1*	5.90	7.95	8.90	10.85	.....
Riverdale, Ill. *A1*	5.70	7.80	8.75	10.70	13.00
Buffalo, N. Y. *R7*	5.45	7.65	8.60	10.55	12.85
Sharon, Pa. *S1*	5.45	7.65	8.60	10.55	12.85
Trenton *R4*		7.95	8.90	10.85	13.15
Wallingford *W1*	6.20	7.95	8.90	10.85	13.15
Warren, Ohio *T4*	5.45	7.65	8.60	10.55	12.85
Weirton, W. Va. *W3*	5.45	7.65	8.60	10.55	12.85
Worcester, Mass. *A5*	6.30	7.95	8.90	10.85	13.15
Youngstown *C5*	5.45	7.65	8.60	10.55	.....

* Sold on Pittsburgh base.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	27.34	32.98	26.51	31.98
	2½	12	36.82	44.41	35.70	43.07
	3	12	42.52	51.28	41.23	49.73
	3½	11	49.63	59.87	48.13	58.06
	4	10	65.91	79.50	63.92	77.10
National Tube	2	13	.....	32.98	26.51	.....
	2½	12	36.82	44.41	35.70	.....
	3	12	42.52	51.28	41.23	.....
	3½	11	49.63	59.87	48.13	.....
	4	10	65.91	79.50	63.92	.....
Pittsburgh Steel	2	13	27.34	32.98	.....	.....
	2½	12	36.82	44.41	.....	.....
	3	12	42.52	51.28	.....	.....
	3½	11	49.63	59.87	.....	.....
	4	10	65.91	79.50	.....	.....

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A-4615 As rolled	Alloy Bars: Hot-Rolled A-4140 Annealed	Alloy Bars: Cold-Drawn A-4615 As rolled	Alloy Bars: Cold-Drawn A-4140 Annealed
Baltimore	.20	6.20	7.12	7.36–7.78	7.00	.....	6.85	6.98	6.86	8.17	.....	.....	.....	.....
Birmingham	.15	6.10	7.00	8.00[4]	6.30	.....	6.35	6.35	6.15	8.90	.....	.....	.....	.....
Boston	.20	6.89	7.53–7.83	9.18–	7.13–	9.35[2]	7.13	7.06	6.87	8.35	12.40	11.94–12.13	14.65	14.55–14.58
Buffalo	.25	6.11	7.10	8.65	6.50	.....	6.45	6.49	6.27	7.65	.....	11.97	14.45	14.30
Chicago	.20	6.18	7.12	7.95	6.42	.....	6.33	6.46	6.28	7.30	.....	11.60	.....	14.05
Cincinnati	.20	6.30	7.11	8.00	6.66	.....	6.62	6.93	6.52	7.60	.....	11.85	.....	14.30
Cleveland	.20	6.18	7.12	8.25	6.58	.....	6.50	6.79	6.34	7.40	12.04	11.74	14.29	14.19
Denver		7.95	8.85	10.45–10.47	8.20	9.55	7.95	7.95	8.05	9.05	.....	.....	.....	15.75
Detroit	.20	6.38	7.29	8.22	6.69	8.36	6.80	6.91	6.56	7.60	12.27	11.97	14.52	13.45–14.42
Houston	.20	7.15	7.60	9.23	7.45	.....	7.20	7.35	7.45	9.30	.....	12.80	.....	.....
Kansas City	.20	6.85	.....	.....	7.09	.....	7.00	7.13	6.95	8.07	.....	.....	.....	.....
Los Angeles	.20	7.25	9.00	8.85–9.50	7.55	.....	7.20	7.35	7.15	9.75	.....	12.90	.....	15.90
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	9.75	*	.....	.....	.....
Milwaukee	.20	6.35	7.29	8.12	6.59	.....	6.50	6.63	6.45	7.89–8.76 7.57	.....	11.77	.....	14.22
New Orleans	.15	6.51	7.41	.....	6.63	.....	6.73	6.81	6.60	8.37	.....	.....	.....	.....
New York	.30	6.78	7.52–7.75	8.37–8.41[7]	7.16	9.15[5]	6.99	6.90	7.06	8.43	12.29	11.99	14.54	14.44
Norfolk	.20	6.90	.....	.....	7.00	.....	7.00	7.00	7.00	8.50	.....	.....	.....	.....
Philadelphia	.25	6.35	7.13	7.87	7.02	.....	6.63	6.67	6.87	8.19	.....	11.75	.....	14.19
Pittsburgh	.20	6.18	7.12	8.00	6.55	.....	6.33	6.46	6.28	7.65	.....	11.60	.....	14.05
Portland	.10	7.60	8.45	9.05	7.65	.....	7.25	7.25	7.35	10.65	.....	.....	.....	.....
Salt Lake City	.20	8.60	10.50	10.50[3]	9.25	.....	8.10	8.25	9.20	11.25	.....	.....	.....	.....
San Francisco	.20	7.35	8.70	8.95–9.45	7.60	.....	7.20	7.25	7.15	9.75	.....	12.90	.....	15.90
Seattle	.20	7.95–8.15	9.30–9.50	9.60–9.80	7.80–8.00	.....	7.40–7.60	7.30–7.50	7.40–7.60	10.45–10.65	.....	13.15	.....	15.60
St. Louis	.20	6.48	7.42	8.25	6.72	7.70–8.53	6.73	6.86	6.58	7.70	12.20	11.90	14.45	14.30–14.35
St. Paul	.15	6.84	7.78	8.61	7.08	13.22	6.99	7.12	6.94	8.06	.....	12.42	.....	.....

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb. (2)20,000 lb or over. (3)450 to 1499 lb. (4)500 to 9999 lb. (5)1000 lb or over. (6)400 to 1499 lb. (7)1500 to 3499 lb. (8)2000 to 5999 lb.

Miscellaneous Prices

(Effective June 29, 1954)

TOOL STEEL

F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.48
18	4	1	—	5	2.16
18	4	2	—	—	1.64
1.5	4	1.5	8	—	.895
6	4	2	6	—	1.005

High-carbon chromium	.70
Oil hardened manganese	.39
Special carbon	.355
Extra carbon	.30
Regular carbon	.25

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24-in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50

6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less .....$129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.00
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed

GRAPHITE			CARBON		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	20.50	40	100,110	8.95
20	72	20.00	35	110	8.95
12 to 18	72	20.50	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
6	60	23.25	20	90	8.95
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	28.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pct Off List

	Less Keg Reg.	K.	Less Keg Hvy.	K.
½ in. & smaller	+2	15	+2	18
9/16 in. & ⅝ in.	+7	11	+32*	+10*
¾ in. to 1½ in. inclusive	+8	10	+27**	+6**
1⅝ in. & larger	+9	9	+27	+6

* 9/16 to ¾ in.
** ⅞ to 1½ in.

Nuts, Hot Pressed—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & ⅝ in.	2	18	+20	net
¾ in. to 1½ in. inclusive	+6	13	+25	+4
1⅝ in. & larger	+8	10	+25	+4

Nuts, Cold Punched—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & ⅝ in.	9	24	+2	15
¾ in. to 1½ in. inclusive	+1	16	+9	9
1⅝ in. & larger	+16	3	+20	net

Nuts, Semi-Finished—Hexagon

½ in. & smaller	23	36	14	28
9/16 in. & ⅝ in.	18	32	4	20
¾ in. to 1½ in. inclusive	8	23	+8	10
1⅝ in. & larger	+14	5	+20	net
	Light			
7/16 in. & smaller	33	43		
½ in. thru ⅝ in.	26	37		
¾ in. to 1½ in. inclusive	18	30		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished	44½—10
Packaged, plain finish	25½—10
Bulk, plain finish**	59*

* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per 100 lb*

½ in. & larger	$8.90
	Pct Off List
7/16 in. and smaller	30

Cap and Set Screws

(In bulk)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	40
¾ in. thru 1 in. up to & including 6 in.	26
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	43
¾ in. thru 1 in. up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes	12
Fillister head cap, listed sizes	7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

Machine and Carriage Bolts

Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	4	20
9/16 in. & ⅝ in. x 6 in. & shorter	5	21
¾ in. & larger x 6 in. & shorter	3	19
All diam. longer than 6 in.	+4	13
Lag, all diam. x 6 in. & shorter	12	27
Lag, all diam. longer than 6 in.	8	23
Plow bolts	30	

REFRACTORIES

Fire Clay Brick *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$109.00
No. 1 Ohio	102.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	102.00
No. 2 Ohio	93.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	16.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$115.00
Childs, Hays, Pa.	120.00
Chicago District	125.00
Western Utah	121.00
California	128.00
Super Duty Hays, Pa., Athens, Tex., Windham	132.00
Curtner, Calif.	150.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	19.00
Silica cement, net ton, bulk, Hays, Pa.	21.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	20.00
Silica cement, net ton, bulk, Utah and Calif.	28.50

Chrome Brick *Per net ton*

Standard chemically bonded Balt.	$36.00
Standard chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite *St. ⅜-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.00
in sacks	43.75

Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	14.60
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, Del'd in East	12.0¢
F.o.b. Iberville, P.Q.	10.5¢
Domestic sponge iron, 98+% Fe, carload lots	18.0¢
Electrolytic iron, annealed, 99.5+% Fe	38.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	83.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.65
Zinc, 10 ton lots	17.5¢ to 25.0¢

Ferroalloy Prices

(Effective June 29, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump size, bulk, in carloads, delivered.

65-72 Cr, 2% max. Si.

0.025% C	34.50	0.20% C	33.50
0.06% C	34.50	0.50% C	33.25
0.10% C	34.00	1.00% C	33.00
0.15% C	33.75	2.00% C	32.75

65-69% Cr, 4.9% C 24.75
62-66% Cr, 4.6% C, 6-9% Si 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads 25.85
Ton lots 28.00
Less ton lots 29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C $1.18
0.50% max. C 1.14
9 to 11% C 1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads 19.00
Ton lots 22.10
Less ton lots 23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads 20.00
Ton lots 22.30
Less ton lots 23.30

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 17.50
Less ton lots 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 16.60
Ton lots 18.10
Less ton lots 19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%; Ti 9 to 11%, Ca 5 to 7%.

Carload packed 17.50
Ton lots to carload packed 18.50
Less ton lots 20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn:

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.00
Clairton, Pa.	10.00
Sheridan, Pa.	10.00
Philo, Ohio	10.00

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 12.50
Ton lots packed 14.05

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 36.95
Ton lots 38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads 30.00
Ton lots 32.00
250 to 1999 lb 34.00
Less than 250 lb 37.00
Premium for hydrogen-removed metal 1.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	30.00	31.85	33.05
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mo, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk 11.00
Ton lots 12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet 12.65
Ton lots, packed 14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $89.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk 6.30
Ton lots 7.90

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	13.80
50% Si	10.80	85% Si	15.55
65% Si	12.20	90.55% Si	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) .. 3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads ..... 9.25¢
Ton lots 10.15

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots $9.50
Less ton lots 9.55

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $4.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.32

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W. ton lots, f.o.b. $3.80

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.12

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound.

Carload, bulk, lump ..... 15.50¢
Ton lots, packed lump ..... 16.75¢
Less ton lots, lump, packed 17.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis lump, delivered, per lb of alloy.

Carload, bulk ..... 8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3-4%, Si, 40-45%, per lb contained B $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound ..... 45¢
Less ton lots, per pound .... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots... $1.20
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B ..... .85
14 to 19% B 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1 ..... $1.00
No. 6 ..... 63¢
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots $1.46
Less ton lots 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered

Less ton lots $2.05

Silcaz, contract basis, delivered

Ton lots ..... 45.00¢